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# OCULAR SYNDROME OF PITUITARY TUMOR COMPLICATED BY EXTRANEOUS FACTORS.

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Three cases are here reported from the Mayo Clinic with comments. The pituitary tumor present in each was associated with purulent sphenoiditis in Case 1, chronic simple glaucoma in Case 2, and chronic alcoholism in Case 3. Bitemporal hemianopsia belongs with pituitary tumor and not with such complications. Read at the Colorado Congress of Ophthalmology, Denver, July, 1927.

The ocular syndrome of pituitary tumor has been well established by many authors, and the associated structural changes are readily recognized. The ocular changes produced by pituitary tumors can be briefly summarized, as (1) lowered central visual acuity, (2) pale optic discs, and (3) bitemporal, or homonymous, scotomatous, or peripheral field defects. These changes are generally associated with enlargement of the sella turcica, with or without erosion of the clinoid processes. The history of the visual disturbance discloses definite progressive loss of vision with fluctuations, in one or both eyes. Glasses, as a rule, are of no aid in increasing the visual acuity.

The cases reported here show the importance of the visual fields in the definite diagnosis of the basic pathologic changes, altho the history and the observations of physical conditions ten to overemphasize the extraneous factors. Inasmuch as any one of the three factors, sphenoiditis, chronic simple glaucoma, and chronic alcoholism, can produce definite ocular changes, the greatest importance should be placed on definite anatomic ocular data.

## REPORT OF CASES.

CASE 1.—*Pituitary tumor associated with purulent sphenoiditis:* A woman aged forty-one came to the Mayo Clinic because of failing vision of three weeks' duration. The general history was negative except that the menopause had been passed at the age of thirty-six.

Examination of the eye revealed vision to be 6/30 in the right eye, and in the left 6/15. The extraocular movements were normal. The pupils were equal and reacted promptly. The media were clear and the fundi negative. The fields showed bitemporal hemianopsia. The general examination, including the Wassermann test on the blood, was negative. The roentgenogram of the head showed a large calcified pineal body. Examination of the ear, nose and throat revealed infection of tonsils graded 2. There were polyps in the middle meatus on both sides and considerable pus in the left nostril. The polyps were removed on the left side and suction and argyrol tampons applied. Following this, vision was much better in the temporal field. One week later a pansinus exenteration was performed with drainage of pus. During the course of this treatment the temporal fields improved and central vision was more acute. The patient was dismissed one month later with the nose in very good condition. She was advised to return in from six weeks to two months and she returned in three months. Bitemporal heminopsia was again found and visual acuity was decreased. Operation was performed and a tumor was found bulging in front and pressing out laterally on each optic nerve. The upper portion of the tumor was so cystic that

a depression was made in it by the optic nerve. The tumor was not adherent and when the capsule was opened about 2 drams of watery, greenish fluid escaped. The pathologist made a diagnosis of carcinoma. After the tumor had been removed the walls of the degenerating cyst collapsed, thus freeing the commissure and optic nerves. During the patient's convalescence the fields showed progressive improvement and central vision returned to 6/7 in the right eye and 6/12 in the left.

perimetric fields did not support the diagnosis of inflammation as they were not the usual type produced by retrobulbar neuritis, namely, the central or cecocentral scotoma with normal peripheral vision, but were rather the common type of field change produced by pressure on the chiasm due to the growth of a tumor. The subsequent course of events clarified the situation, and intracranial operation proved conclusively the nature of the lesion. The gain in visual acuity and the widening of the temporal fields following the re-

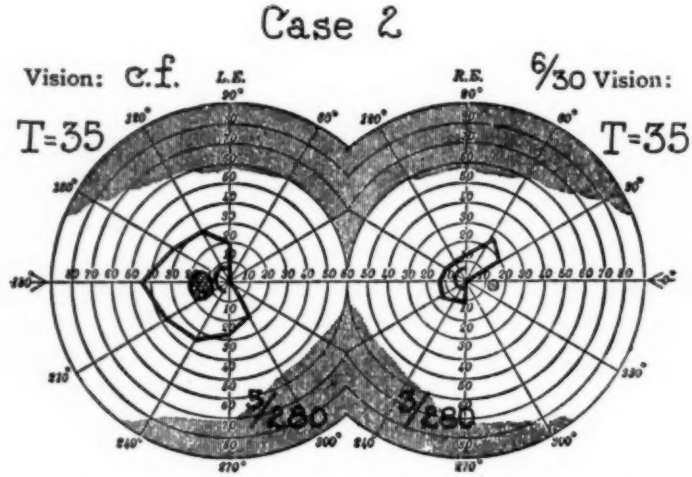


Fig. 1.—Perimetric fields. Red and green recognized at center of field. Enlarged blind spot in left field.

The patient returned for observation after two years because of drainage from the old wound. The vision at this time was 6/10 in the right eye, and in the left 6/6. The perimetric fields had remained unaltered since the operation. Operation was now performed for chronic osteomyelitis of the skull. Uneventful convalescence followed.

COMMENT.—The somewhat rapid onset of the visual disturbance without changes in the sella turcica associated with definite purulent sphenoiditis, and with none of the usual metabolic disturbances of pituitary tumor made the diagnosis of a secondary inflammatory lesion of the chiasm justifiable. This view was more or less supported by the improvement of vision and fields, following treatment of the nose. The moval of the pituitary tumor was much greater than that following the intranasal operation. Also the gain has been constant. In retrospection, the purulent sphenoiditis probably rapidly precipitated the visual disturbance, as the progressive loss of vision is usually slow in cases of uncomplicated tumor of the pituitary.

CASE 2.—*Pituitary tumor associated with chronic simple glaucoma:* A woman aged fifty-seven came to the Mayo Clinic because of failing vision. Eighteen years previously, while she was doing close work, pain in the eyes developed and was relieved by glasses. Vision had remained normal until two years before examination when it began to fail rapidly and was not relieved by glasses. She consulted various oculists thruout the country without relief.

Examination of the eye revealed vision of the right eye to be 6/30 with glasses, of the left eye ability to count fingers. Extraocular movements were normal. The pupils were equal, slightly dilated and reacted somewhat slowly to light. The media were clear. The fundus, particularly of the right eye, showed moderately pale, definitely excavated discs. A few of the vessels were lost at the margin of the disc and there was slight arterial pulsation. The tension by Schiötz tonometer was 35 in each eye. The perimetric fields showed definite right homonymous hemianopsia with enlargement of the left blind spot (Fig. 1). At this time vision and fields were strongly suggestive of a chiasmal lesion, while the intraocular tension and discs furnished evidence of chronic simple glaucoma. General examination was negative except that the roentgenogram of the sella turcica showed enlargement graded 4, with erosion of the posterior clinoids (Fig. 2). The neurologic examination was negative except for the visual disturbance. Under eserin and pilocarpin solutions the intraocular tension decreased to 18 in the right eye, and 22 in the left eye in two weeks, and held fairly constant after that. A course of high voltage roentgen ray treatment was then given to the entire pituitary region and the patient advised to have this treatment repeated two or three times at intervals of six weeks.

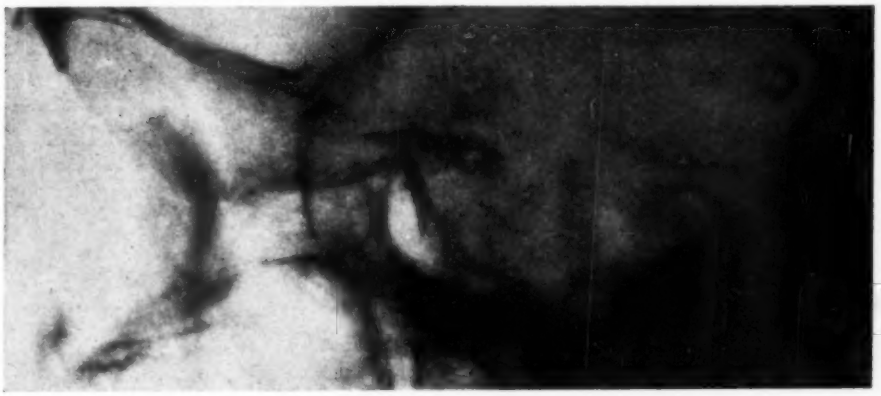

Fig. 2.—Enlargement of sella, grade 4, with erosion of posterior clinoid processes. (Case 2).

The perimetric fields or vision did not change during the patient's stay in the clinic altho the intraocular tension returned to within the normal under myotics.

COMMENT.—The diagnosis of two distinct lesions affecting the optic nerves is of great importance in the ultimate prognosis. Again, the perimetric fields were paramount in definitely locating the pituitary tumor. The objective ocular data were typical of chronic simple glaucoma, namely, the excavation of the optic discs, and the increased intraocular tension, but it was impossible to explain homonymous hemianopsia resulting from increased intraocular tension affecting only homonymous parts of the optic discs. The roentgenogram of the sella turcica, the lowered visual acuity, and the homonymous hemianopsia definitely established the diagnosis of pituitary tumor. I have been unable to find a similar case reported in the literature.

CASE 3.—*Pituitary tumor associated with chronic alcoholism:* A man aged forty-six came to the Mayo Clinic complaining of disturbance of vision and memory. When a child he had been kicked in the head by a horse without apparent serious effect. At the age of thirty-five years, he is supposed to have had sleeping typhoid. He has been a moderate smoker of cigars but never drank excessively until three years before examination. About this time he noticed that vision was getting foggy,

but it did not incapacitate him in any way. Following this the vision gradually became worse and a year later he had diplopia which persisted for a short time and then disappeared. During this year he took two drinks of "moonshine" and slight loss of vision developed temporarily. About three months later he was severely beaten by a number of men and struck on the back of the head and rendered unconscious. He was laid up for about a week or ten days. Since then central vision has progressively decreased ac-

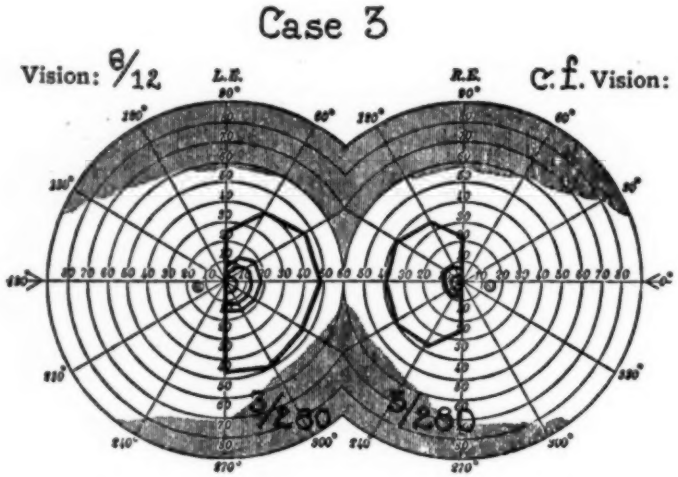


Fig. 3.—Perimetric fields. Bitemporal hemianopsia. Narrowed nasal fields.

companied by a narrowing of the temporal field. Every time he drank whiskey he noticed that vision decreased. It failed steadily and at the time of examination he read large print with difficulty.

Examination of the eyes revealed ability to count fingers in the right eye and to read 6/12 in the left. The pupils were equal and reacted normally. Examination of the fundus revealed pearly white optic discs, and slightly contracted arteries. The perimetric fields revealed bitemporal hemianopsia for form and colors (Fig. 3). General and neurologic examinations were negative. The roentgenogram of the sella was normal. The basal metabolic rate was —17. A diagnosis of pituitary tumor was made.

At operation a large oval tumor of the pituitary was found extending up over the chiasm. The capsule was bluish-gray and so fibrous that it remained distended after the tumor had been enucleated. The pathologist reported carcinoma in adenoma of the pituitary. The patient died four days later and necropsy revealed extreme flattening and distortion of the optic nerves and chiasm and anterior part of the optic tract produced by the pituitary tumor, which pressed upward into the base of the third ventricle. Thrombosis of the right internal carotid artery extended into the middle and anterior cerebral artery and the anterior half of the right cerebrum was softened.

COMMENT.—As near as can be ascertained from the history of the case the visual disturbance really started a short time before the patient began to drink but the progressive visual disturbance was not noticeable until he regularly drank all types of "bootleg" whiskey. The duration of the repeated insults to the optic nerve by the whiskey, and the pressure produced by the pituitary tumor persisted for three years before vision was too poor to carry him on. Again the perimetric fields were the important objective ocular data in making the diagnosis of pituitary tumor, as the effects of alcohol alone on the optic nerves causes

retrobulbar neuritis which is characterized by either a central or cecocentral scotoma with good peripheral fields, or sudden blindness which later usually improves. It has often been observed that the drinking of whiskey temporarily decreases visual acuity in cases of pituitary tumor.

SUMMARY.

The importance of the bitemporal hemianopsia defect of the visual fields in these three cases can not be overemphasized. In our experience, an inflammatory condition has never produced bitemporal hemianopsia, with the exception of basal gummatous meningitis, or multiple sclerosis. This group of inflammatory lesions is so small when compared to the group of bitemporal hemianopsia due to chiasmal lesions, namely, pituitary, interpedunculary, nasopharyngeal, suprasellar, tumors of third venticle, primary tumors of the chiasm, and aneurisms, that too much importance should not be placed on the extraneous factors. The usual effects on the optic nerves of inflammation or toxin is characterized by retrobulbar neuritis with decrease in central visual acuity associated with central or cecocentral scotoma, with preservation of the peripheral fields. Many bizarre field defects are produced by inflammatory lesions either unilaterally, as in tabes dorsalis, or bilaterally, as in optic atrophy produced by syphilis of the central nervous system and encephalitis. But they are not to be confused with the almost pathognomonic field defects produced by tumors near or at the chiasm. Finally bitemporal or homonymous hemianopsia, associated with lowered visual acuity and normal or pale optic discs, should always suggest tumor near or at the chiasm, regardless of any or all extraneous factors.

*Mayo Clinic.*

# PHOTOGRAPHIC STUDY OF HOLES IN MACULAR REGION AND ASSOCIATED CHANGES.

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The appearances of these lesions reproduced by photography are shown in the accompanying plates. They are grouped as produced by direct contusion of eyeball, penetration of globe, vascular changes, slow or rapid, detachment of the retina and inflammatory diseases. Notes of various cases call attention to details shown. Read before the American Ophthalmological Society, June, 1927.

The macular region has not only been of the greatest interest to ophthalmologists but is also the part of the retina most difficult of examination. Because of the very great changes in the visual function resulting from innumerable alterations in the macula, this particular portion of the retina has been the subject of numerous investigations, many drawings have appeared and several detailed pathologic reports. With the Gullstrand ophthalmoscope it appeared clearer than with any other instrument; with the binocular attachment stereoscopic examination was possible and minute changes were, therefore, more clearly seen. But now, by the use of the Nordenson camera, with its increased magnification and intense illumination, we not only see the macular region but also the fovea. In photographs, the area is most beautifully brought in contrast by manipulating the source of light.

Noyes in 1871 reported before this society on "Detachment of the Retina with Laceration at the Macula Lutea."

Ogilvie in 1900 before the Ophthalmological Society of the United Kingdom read a paper on "One of the Results of Concussion Injuries of the Eye" (Holes at the Macula). He reported fourteen cases collected by himself and English confreres. His illustrations are excellent, his discussions concise and clear.

Kuhnt in 1900 Zeitschirft für Augenheilkunde, page 105, and Haab, page 113, in the same year, in fact in the same journal, spoke on the subject.

DeSchweinitz in 1904 in an article entitled, "Concerning Certain Nontraumatic Perforations of the Macula Lutea," called attention to two cases in which the appearance was exactly that of a traumatic macular hole. In one the condition was the result of heart disease and arteriosclerosis, and the other followed iritis. In the discussion of his paper, Kipp reported a case in which the patient had never had either an inflammatory condition or suffered from an injury.

No attempt is made to cover the literature but two articles are worthy of attention, that entitled, "Pseudonephritische Netzhauterkrankung mit Loch in der Macula nach schwerem Schadeltrauma," by Nitsch, Zeitschrift für Augenheilkunde, page 229, 1924, and the other day by Heine, "Beitrage zur Anatomie der Macula lutea" in the Archiv für Augenheilkunde, 1926. The last article appearing in three numbers admirably presents the latest viewpoint on the normal and pathologic changes in this region.

As far as we know, a photographic consideration of the macula has never been presented before any society. Therefore, before we discuss pathologic changes we draw attention to the macular region as recorded on the photographic plate. It is a well known fact that the macula occupies no special position in relation to its distance from the optic nerve. The accurate measurement of a large series of photographs shows that the photographic nervehead may vary in size from 5 mm. to 8.5 mm. and that the distance from the temporal margin of the nerve to the nearest edge of the macula varies from 8.25 to 15.25 mm. Further, the distance is neither dependent upon the size of the nervehead, nor does it seem upon the refractive error. As examples, in one case where the nerve was 5.5 mm. in its horizontal diameter, the macula was 10 mm. from it. In another case the disc was 5.5 mm. and

the macula was 15.25 mm. away from it, while in a case where the nerve was 8.5 mm. the macula was only 9.75 mm. distant.

Our study is based on the photographic examination of more than 2,000 eyes. The retinal reflex surrounding the macular region is best seen in the child. The area varies in size and contour in so many ways that only by the examination of a large series of cases and photographs is it possible to draw any trustworthy conclusions.

The gross vascular supply is derived from two major trunks, the superior and inferior. The capillaries encircle the macular region and it is possible to show that these vessels are elevated from the surrounding retina and so interlaced as to give the impression of a crown. In some patients the minute vessels are so small that it is difficult to portray them. The fovea as frequently pictured is lighter than the macular area and stereoscopically it is found, as is well known, on a deeper level than the surrounding tissue.

The earlier writers confused hole in the macula with hemorrhage. In a recent case, hemorrhage might easily have been mistaken for hole, for the blood clot occupied the macular region and only by frequent examinations and serial photographs was it possible to make an early differential diagnosis.

Lagrange in his most excellent book on war injuries seems to include some holes as hemorrhage. In arteriosclerosis, we have hemorrhages frequently surrounding the macular region and with the edema accompanying certain toxic changes such as in the chronic interstitial nephritis, we may not only have the radiating lines of exudate but also the deeply depressed dark macular appearance.

Our special topic is hole in the macula as seen in the photograph. Depending upon either cause or associated conditions, we subdivide them into these following groups:

1. Direct contusion of the eyeball.
2. Penetration of the globe.
3. Slow vascular degenerations.
4. Rapid retinal vascular changes.
5. Detachment of the retina.
6. Inflammatory disease.

Four cases are recorded in the first class, direct contusion of the eyeball. V. L. a 16 year old boy who had been previously examined and found to have normal vision in the right eye, came in ten months after his last examination complaining that as a result of the explosion of a can of carbide, which had struck his right eye, he was unable to see with it. There were several scars on the eyelids and opacities in the superficial layers of the cornea. Vision 5/200, pupil 6 mm. stationary. Nerve pale, oval 6.5x7.25 mm. a slight decrease in the size of both arteries and veins with absence of small capillaries. Surrounding the nerve was a large, ovoid zone about 22 mm. in diameter in which the pigment had been absorbed and migrated into small granular masses. There were two distinct ruptures of the choroid, one about 3 disc diameters in length, 18 mm., curving around the temporal and superior margin of the nerve and showed considerable separation varying from 2 mm. below to 3.5 mm. above. The proximal edge was 4 mm. from the disc. The furrow in the separation was not uniform. The inferior three-fifths was outlined by a slightly elevated pigmented black ridge. The vessels passed over the rupture without alteration in caliber. About 1.5 disc diameters, 10 mm., to the temporal side of this rupture was another about 24 mm. long with concavity toward the disc, with a greater radius than the other tear. The separation of the choroid is less and the zone of disturbed retinal pigment does not extend beyond its nasal border. In the macular region there was a hole so obscured by a thin but definite gray white cloud over most of its surface, that without careful observation it would pass as a continuation of the retinal break and not be distinguished as a macular hole. This dark practically round depression 3 mm. in diameter was 12 mm. from the disc margin.

A. S. a 27 year old man came in two months after having been struck by a piece of stone. He complained

that something was obscuring the vision of the right eye and that at the time of the accident he bled from the right side of his nose. Right eye vision 1/200. The globe was 1 mm. more prominent than the left. Pupil 4.5 mm. regular, active, media clear, disc pale with two small patches of retained nerve sheath, one at the superior temporal margin and the other below. In the inferior retina there were many superficial rounded, ball like hemorrhages. In the macular region there was an almost perfectly round hole about 2.5 mm. in diameter. As the disc was 8 mm. in diameter, the hole was about ¼ the disc diameter. The macular area was distinctly depressed, positively on a lower level than the surrounding retina.

The patient was seen six weeks later, the hemorrhages had absorbed but there was no change in the hole except that surrounding it were several small, black elevated pigmented dots suggesting a double ring.

C. P. was examined when he was seven years old. He had a very marked retinitis proliferans and definite macular changes. It was impossible to get any history from him so that we are unable to state when the eye became involved. Externally there was no evidence of previous injury or deviation from normal. Vision in the right eye was 12/200. Pupil 4 mm. regular and active. The nerve was greatly distorted, ovoid 7.5x10 mm. The blood vessels projected from its lower temporal side and the upper divisions branched in a fairly normal way. The lower vessels were obscured by a mass of grayish white connective tissue which extended forward and was part of a long, broad band. This strand was in parts thick, dense white and in other portions thin. This was well shown in a composite photograph.

There was a sharply punched out almost perfectly round macular hole. This was about one diopter deeper than the surrounding fundus. It appeared very dark red and the edge was sharp. Overlying it was a thin filamentous white membrane with one very white oval patch near the upper margin of the hole. Surrounding the opening there was an irregular migration of pigment which altho faint was clearly seen.

L. C. a 17 year old boy was struck in his right eye by a baseball. Four years before the accident the eye was known to be normal. The globe was filled with blood. Seventeen days after the accident a good view of the fundus was obtained and a very dark red macular area with many radiating white lines of retinal edema was found. In five years there has been no change in the macular hole. Right eye vision 12/200. Pupil 3.5 mm. regular, active, media clear. Disc almost round, 7 mm., clearly outlined, vessels prominent and the retina strongly reflecting the light.

In the macular region there was a heart shaped dark, depressed area 5 mm. in its greatest diameter, 11 mm. from the disc margin. The edge was sharp and easily determined; overlying the border were nine minute white dots. These were anterior to the retina. The indentations corresponding to the base of the heart was made by an overhanging projection of gray membrane. The field of vision showed an irregular central scotoma.

The change following penetration of the eyeball is sometimes striking. As an example, T. C. was first seen five years after a 32-caliber pistol bullet had penetrated his right eye. X-ray showed many particles of lead spattered about his right cerebral hemisphere. There was a depressed fracture of the orbital ridge. Right eye vision 6/200. Pupil 4 mm. regular, active. media clear. A pale 8 mm. disc presented an elevated, rounded, gray nasal margin over which the major vessel trunks passed. The temporal half of the disc was white and atrophic. The lower half of the retina was practically uninvolved, the arteries and veins were about normal in size and distribution. The upper half of the retina particu-

*Note: The measurements are those taken from the photograph and must not be misunderstood as to indicate the actual size of the disc or the macular hole. They are used for comparative purposes. The usual magnification is about 1.25 diameters.

*Picture 1*—J. S., a boy of 15 years, was struck over the left frontal region by a phonograph record. There was a laceration through the eye-brow and an immediate marked impairment of vision. When the blood began to absorb from the vitreous, it was possible to see and photographically record the progress of the retinal absorption.

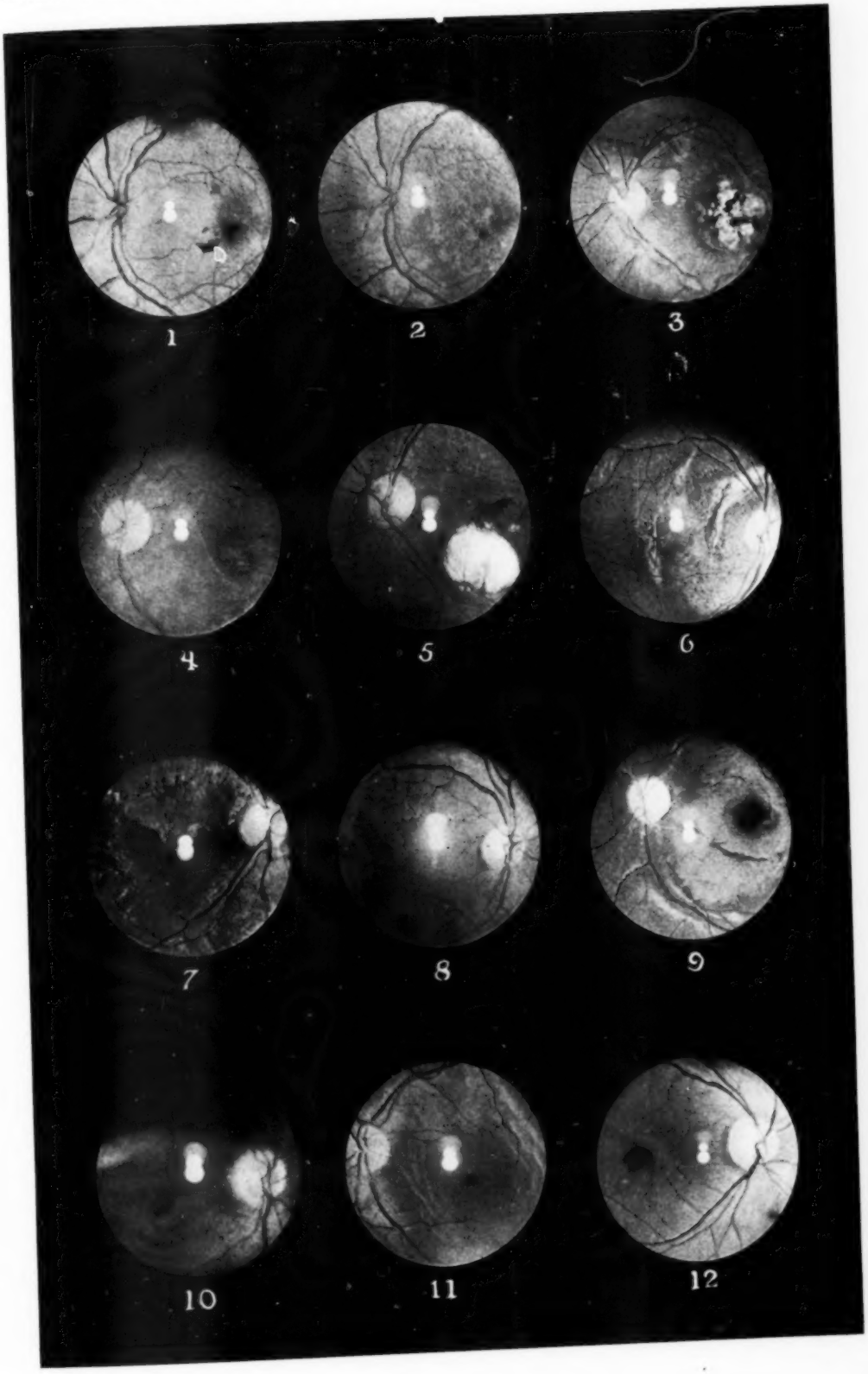
*Picture 2*—Taken five days later, shows the absorption of the blood with the formation of many rounded areas of pigmentation and the change in color of the macular region, it being gray, mottled with dense black. Far in the periphery, not in the plate, there were two choroidal ruptures.

*Picture 3*—Illustrates the vitreous band which overlies certain degenerations of the choroid. Stereoscopically this gray sheet is seen to be a considerable distance in front of the destroyed retina and choroid. Picture is taken from the eye of an 18 year old boy who had had reduced vision since infancy. The observation of cases such as this leads to one of the conclusions of the paper.

*Picture 4*—A foreign body had been in the eye of B. C., 21 years of age, for several months before he came under observation. The photograph shows a connective tissue film about the pale peri-macular region in which there is some pathological pigmentation. Vision 2/200.

*Picture 5*—C. S., a 53 year old woman. Left eye divergent since infancy. Vision 1/200. Pupil 4 mm. regular, active, media clear, disc 7x8 mm. is pale, sharply outlined, vessels small, slight perivascular reflex especially along the lower nasal vessels. About the macular region, there is a 15x19 mm. area, the lower portion 12x8, is a coloboma of the choroid, deeply depressed with a sharp margin over which the retinal vessels pass. The inferior temporal vein forms a loop which projects over the edge. The white floor of the coloboma is speckled with brownish pigment. Above the coloboma the retina is thin with two white areas above it. The retina itself is partly degenerated, the pigment irregularly migrated and the entire area on a deeper level than the surrounding retina, although it is not as depressed as the atrophic portion. The vessels above the colobomatous zone are irregular in caliber and in portions partly obscured by a thin gray film.

*Picture 11*—Spontaneous finger roll detachment of the retina showing the elevated ridges around the dark macular area in a 47 year old man with vision of 10/200.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## *STEREO PHOTOGRAPHS*

***Pair 1***—A traumatic hole in the macular region in a 27 year old man who was struck in the eye with a large piece of stone.

***Pair 2***—Macular degeneration of rapid onset in a 59 year old woman with high myopia and generalized vascular changes. Macula appears dark red surrounded by pale crescent.

***Pair 3***—Traumatic macular area in a 17 year old boy, the direct result of the impact of a baseball against the globe.

***Pair 4***—Retinitis proliferans with a large, distinct macular hole with overlying filamentous white membrane.

## TO GET STEREOSCOPIC EFFECT OF DEPTH

Place a pair of convex 4 D. or 5 D. lenses before your eyes. A trial frame permitting wider separation of the lenses than the interpupillary distance will make it easier. Bring the Plate about 3 inches from the eye and look off, as when using the ophthalmoscope for the direct method. When the two pictures have come together (an additional picture appearing on each side), draw back from the Plate until the middle picture is clearly focused and seen in relief.

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larly the superior temporal quadrant, was pale, the vessels absent or small, the pigment was in circumscribed more or less rounded elevations. The macular region was dark red like a punched out hole 6.5 mm. in diameter. Three-fifths of the circle was sharply outlined but the upper nasal two-fifths was covered by a gray retinal opacity.

Characteristic slow degeneration of the retina followed by a rapid or strikingly sudden loss of sigh was illustrated by the case of Mrs. S. J. H., 59 years of age, who complained of her vision which had always been poor and for which she had worn glasses at least twenty years. She stated that for about three weeks she had been conscious of a dark spot before her right eye.

Vision 3/200. Pupil 4.5 mm. regular, active. There were several fine floaters in the vitreous, the disc 7.25 mm. was partly surrounded by a pale staphylomatous area. The choroid was easily visible thru the thin retina.

In the macular region, 11.5 mm. from disc, there was a 7x4.75 mm. horizontally oval area, which was partly encircled by a granular, black band. The macula itself 3.5 mm. was dark red. Between it and the pigmented border was a pale crescent. The entire region was markedly depressed and suggested a deep hole in part of which pigment was so formed as to project forward.

Another case of similar type, associated with a very marked arterial thickening, was that of Mrs. M. D., 70 years of age, who was seen eight weeks after the removal of a large goiter. She complained of poor sight, vision 20/200. Pupil 4 mm. regular, active. The photograph showed the disc 6 mm. clearly outlined and in the macular region, 13.5 mm. from the nerve border, a sharp clear cut 3 mm. depression, dark red and doubtless a hole. The left eye showed advanced arteriosclerosis with obliterated arteries.

Rapid vascular changes leading to the destruction of the macular region are illustrated by the case of Mrs. G., 22 years of age. We had previously seen her and knew she had a normal retina. She suddenly lost the sight of her left eye. This was seemingly associated with pregnancy, for she had an embolism of the central artery of the left retina.

Right eye vision 20/15. Pupil 3.5 mm. regular, active, media clear, fundus negative. Left eye light perception. Pupil 5 mm. stationary except for consensual light reaction. Media clear. Edema of the retina with thread like arteries and veins and a marked increase in the red macular reflex. Examination made a few months ago, right eye 20/15. Left eye blind. Disc was white 6.5x7 mm. and all of the vessels were exteremely small with marked periarteritis and interrupted blood stream. The retina appeared like cut velvet and there was a dark ragged depressed macular area 3.5x4 mm. in size and 11 mm. distant from the disc.

Mr. J. S., 66 years of age, came in on the 8th of February, 1927, complaining that the day before he had suddenly noticed a black sheet before his eyes. Examination showed vision of the right eye 2/200. Pupil 2.5 mm. regular, active, media clear. There was a large prominent detachment of the retina in the upper superior quadrant. The left eye was blind and from the appearance and history the diagnosis was a previous detachment with secondary cataract. The lens showed marked anterior and posterior adult nucleus opacities.

After being under observation about a month, it was noted that the macular region appeared dark red by contrast and as the detachment increased, the macular area became more distinctive and in one of his late pictures the photograph showed the disc to be 7 mm. the macular hole horizontally oval 4x2.5 mm., 11 mm. from the disc. Radiating folds of gray retina extended from the superior edge of this region toward the waving gray detachment. The hole was dark red and surrounded by edematous elevated retina.

An inflammatory disease of the uveal tract may lead to the formation of a macular hole. The destructive process may be checked before complete disso-

lution of the isolated portion of the retina.

Mrs. M. P., age 33, came in ten years ago because of pain and poor vision. She had a severe uveitis, and a secondary glaucoma which failed to respond to local measures so that an iridectomy was performed. In May, 1927, vision with —4.00x75° 20/20. Thru a large, clean coloboma, the disc was clearly outlined, slightly pale, about 8 mm. in diameter. Ten millimeters from the edge of the disc there was an elevated crescent from which several folds in the retina extended as gray ridges. The temporal side of the crescent formed the margin of the macula. The part of the 4 mm. macula nearest this bank was pale, while the remaining 2x4 mm. zone was dark and on a perceptibly deeper level. This case may be in the class described by deSchweinitz as a macular degeneration which was checked before complete destruction.

We are not unmindful of the fact that an actual hole of the macula has not been demonstrated pathologically, but there are many reasons for this, the most important one being that eyes so affected are seldom subjected to pathologic section.

Conclusions: An unmistakable dark depressed area may be found in the macular region in certain eyes following a severe contusion or a penetrating injury. The same dark red spot may be observed in some patients suffering from chronic blood vessel disease and also occasionally in some cases with acute obstructive changes in the retinal circulation. Under as yet undetermined conditions, this "hole" may develop with retinal detachment and in some isolated types of iritis or uveitis.

The camera materially assists in the accurate differentiation between the various macular lesions. The photograph makes the record permanent and by stereo pictures the outline of the lesion, the surrounding edge, the overlying parts and the general relation to the remaining portions of the fundus may be clearly studied.

Finally: the photographic examination shows that the vitreous overlying a patch of choroiditis is frequently thickened and appears as a gray film. It does not seem improbable that the isolated gray or white flecks which surround or overlie the macular hole may be adherent thickened vitreous.

By the presentation of these photographically clear holes in the macula, the subject of macular changes will be given a new impetus and it may be that some cases heretofore unrecognized may be brought to light.

To Mr. James A. Glenn is due the credit for the skillful development of the photographs.

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# LACERATION OF RETINA.

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Laceration of detached retina is important for diagnosis and prognosis. In one case traumatic laceration was caused by a giant magnet extracting a piece of steel. In a case of spontaneous tear a vessel crossed the opening which was invisible eight months later. Studied in the University Eye Clinic of Prof. Meller, Vienna.

The appearance of a tear in a detached retina has a great importance both in the diagnosis and prognosis of certain ocular conditions. Lister[1] believes that if we can detect a hole in the retina we can exclude tumor as the underlying cause of the detachment. The pathologic examination of the cases of ocular tumors reveals that the subretinal fluid contains much more albumin than the vitreous; it means that the presence of a hole is most unlikely, otherwise there would be a more or less interchanging of the two fluids. Besides that, the onset of the detachment is exceedingly rapid when it follows a tear in the retina.

On the other hand a tear also bears some prognostic value in the treatment of the detachment. Lister has also the opinion that reattachment, either spontaneously or after treatment is practically hopeless, if such a hole be detected in the retina; and in most cases, if reattachment does take place, the result is only very transient, and subsequently the detachment reappears. But Gonin[2] reported two cases of reattachment with holes near the ora serrata, and one of them showed no reappearance after the lapse of three years. However, the presence of a tear in the retina will invariably allow the liquified vitreous to pass into the subretinal space again, even when it has become reattached, and the prognosis seems not so favorable as in cases where there is no tear in the retina.

Many cases of detachment where the treatment has been fruitless may be due to the presence of an undetected tear. The diagnosis of a tear in the retina is not always easy; it may be obscured by the folding of the detached retina, or by the subsequent retinal changes; and in most cases, is located in the very periphery or at the ora serrata. In every case of sudden detachment a tear should be suspected, and a most careful examination with the pupil dilated should be made. In certain cases, a late examination sometimes will reveal such a tear.

Clinically we find two kinds of retinal tears, one which is located centrally in the macular region, and the other more peripherally situated. The central hole of the macula has been more fully treated in the literature, and numerous cases have been reported. Its mechanism of development may be in many cases similar to that of the more peripheral type of tears, but in most cases we are not able to explain them by the same theory; for instance, we seldom see an extensive detachment following a hole in the macula. It may be due to the fact that there is no real hole in some of the cases, but only a cyst in this region which may sometimes simulate a hole.

In the following pages, I will limit myself to the more peripheral type of tears in the retina. The cases are reported because they represent some unusual mechanism of development of the retinal tears.

## TRAUMATIC LACERATION OF RETINA.

After an injury, an isolated rupture of the choroid is much more frequently seen than a retinal laceration. The choroidal rupture presents a typical curved slit, with the intact retinal vessels passing over, and is usually located in the neighborhood of the disc on its temporal side. In this region, near the entrance of the optic nerve, the wall of the eyeball is very resistant as the sclera is thick, and at the same time the retina is reinforced by the increase of the nerve fibers, so retinal tear is very seldom seen. The retina

lies only loosely on the choroidal coat and to a certain extent it is more or less movable, while the choroid, on the other hand, is firmly connected to the sclera by the entrance of a great number of vessels and nerves. Any blunt contusion of the eyeball will lead to a rupture of the choroid first, because of its anatomic structure Sometimes the retina at the same time may be torn in some other spot. An isolated retinal tear is rather rare; it is usually associated with injuries of the other coats as well.

Tears of the retina may occur after injuries of all kinds, perforating, nonperforating, direct or indirect. The tear may be due to the formation of a membrane after the organization of an exudate or blood. The main localization of such traumatic tears are either around the papilla or more peripherally, especially in the neighborhood of the ora serrata, and in the central region, where the formation of a hole is usually the rule. In a retinal tear we frequently see hemorrhages in the vitreous, and rupture of the choroid on the temporal side of the disc. In most cases, at the beginning, the diagnosis may not be possible. Later, especially in cases of more severe contusions, as following a gunshot injury of the orbit, when the fundus can be examined, such changes as the effusion of blood, the formation of the connective tissue and the irregular vessels, the migration of the pigmented epithelium, etc., often obscure its exact diagnosis.

The retinal tear varies greatly both in size and shape. One sees tears ranging from a small hole or a slit to the most extensive lacerations, such as a total dialysis at the ora serrata or a complete tear around the papilla. The shape also varies considerably, from round or slit like to the most irregular forms. Sometimes, the retina is torn away as one piece at the ora serrata, by the immediate influence of an injury; and later the contraction of the newly formed connective tissue may pull the entire retina to the other side, so that we can see the posterior surface of the retina, and at the same time, the naked choroid is exposed.

The most common form of tear, seen clinically, is the one following a contusion of the eyeball from the front. By a sudden blow, the anterior segment of the eyeball is compressed, and the force is immediately transmitted backwards to the posterior half of the eyeball. This sudden increase of tension inside the eyeball will radiate to all directions alike, but the resistance of the wall of the eye is different in different places. The retina is frequently torn near the ora serrata, where it is very delicate and the wall of the globe here is reinforced by the presence of the ocular muscles, if this increase of tension should exceed the limit of the elasticity of the retina. Frequently, the choroid is also ruptured. Clinically, it is very rare to find the rupture of both the coats at the same spot, but it is not infrequently met with anatomically; and in cases of choroidal rupture there may be at the same time a complete or only partial tear of the external layers of the retina. The nerve fiber layer and the vessels are the more elastic components of the retina. Therefore they usually escape from being torn, and clinically appear to be uninterrupted. Wagenmann[3] in 1902, reported a case anatomically, where the tears of both coats were found at the same spot.

In more severe injuries, where the sclera is at the same time ruptured, of course, the retina can be torn away, and prolapses together with the other contents of the eye. Similarly it may happen in an expulsive hemorrhage during an intraocular operation.

The retina may also be most severely injured by force coming from behind, as in the case of a gunshot injury of the orbit. In such cases the tear lies parallel to the direction of the force. The mechanism is similar to that of the injury due to force coming from the front. In Pagenstecher's[4] case, the shot went obliquely from above to the nasal side below, and remained in the posterior part of the orbit. Two weeks later the ophthalmoscopic examination revealed a choroidal rupture, and be-

low and temporally a curved row of retinal tears of various sizes and shapes. Other complications in the anterior segment of the eyeball are also commonly observed.

In partial or complete evulsion of the optic nerve, either due to a blow from the front or otherwise, the retina is torn away from the disc, but in such cases the retina often does not retract and there is no detachment seen.

sometimes met with in anatomic sections.

The retina may also be injured by perforating injury or by the entrance of a foreign body from the front, which travels backwards thru the lens or ciliary body. The foreign body after having traversed the vitreous cavity may imbed itself in the retina on the opposite side without further injury to the choroid. Occasionally, the force is of such a degree that it may pene-

Fig. 1.—Small detachment and laceration of retina near foreign body in lower periphery. Choroid seen thru opening.

In 1877, Fuchs[5] described a peculiar dialysis of the retina at the ora serrata, after discission of an after cataract, in which the detached retina could be seen thru the coloboma. In cataract extraction, the zonular fibers and the ciliary body are often irritated, leading to a proliferation of connective tissue and a hyperplasia of the epithelium of the ciliary processes. These connective tissue bands may fix the after cataract so fast to the ciliary body and the ora serrata, that during the needling, the retina may be partially torn away. Such cases, tho rarely observed clinically, owing to the technical difficulty in ophthalmoscopy, are

trate the choroid, and even the sclera, and result in a socalled secondary perforation of the eyeball.

The following case will illustrate a special kind of retinal laceration after a magnetic extraction of an iron foreign body.

Z. 57B.—Z. A., a young man of 24, whose left eye was injured by an iron splinter in the summer of 1926, came to Professor Meller's clinic on November 14th. He had been treated immediately by his family physician. From that time his vision had become slightly impaired, but there was no considerable change.

R. E.—Normal on examination.

L. E.—The eyeball was pale, the cornea bright and in its inferior quadrant there were two fine round scars. A little below was a 3½ mm. long perpendicular, grayish, linear scar. The anterior chamber was of normal depth. The lens showed, corresponding to the linear scar in the cornea, a similar opacity which lay in the capsule and in the cortical part. In the posterior cortical part of the corresponding place an irregular large opacity was seen.

Fundus.—(With dilated pupil.) In the nasal and lower quadrant there was a pure white, bright, sharply outlined mass, the foreign body, which was in the extreme periphery of the retina. The examination with the giant magnet gave a positive result. After the first employment of the giant magnet, a small slit like tear of the retina was to be seen just above the foreign body, which had moved a little towards the periphery, and had been lifted from its bed. The ophthalmoscope and the simultaneous use of the giant magnet revealed that the foreign body moved a little bit as soon as the magnet was approached. In the retinal hole, which was the bed of the foreign body, were seen two more small whitish spots, fragments of the foreign body. The edges of the hole were whitish and appeared slightly edematous, and were turning towards the vitreous cavity. The retina was slightly detached, and the vessels running over the detached part showed typical black color. The naked choroid, seen thru the tear, was slightly edematous, otherwise normal. (Fig. 1.)

On the 19th of November the trial with the giant magnet was continued, but the foreign body did not change its position. Posterior sclerotomy was done inferior nasally. There was no success with the introduction of the Hirschberg's magnet. The foreign body was finally extracted by the tip of the giant magnet which has been introduced into the lips of the wound. The anterior chamber was restored in the following day. Ophthalmoscopic examination showed a few small hemorrhages in the part surrounding the tear, and some were also found in the vitreous and no detachment. There was a normal course of healing.

Condition on discharge, January 10, 1927.—There was no detachment. Around the tear—which was oval in shape and about the size of the papilla, was found a strip of pigments more marked on the nasal side of the tear. The hemorrhagic spots had entirely disappeared.

Vision.+1.0 with +1.0 cyl. axis 155.=6/9.

Examination on the fourth of April showed no change in the vision. Corresponding to the old bed of the foreign body, there was seen an oval patch, the more peripheral half of which was of snow white color, the exposed sclera; and the central half, more or less grayish in color, the newly formed connective tissue. On the temporal side of this patch was a red line, and nasally a big mass of pigment was seen. There was no detachment.

This is an unusual case because the retina became lacerated by the action of the giant magnet. Before its employment we found no trace of a retinal tear, and the foreign body was well fixed to the retina. After the first trial with the giant magnet, the foreign body together with a whole piece of the retina was removed, and exposed the naked choroid, which was practically normal. The retina, being such a delicate structure, like the brain substance, is not able to produce much connective tissue by itself, which would prevent it from being torn by the action of the magnet, yet it is sometimes strong enough to hold the foreign body in place even when the giant magnet is employed.

The choroid had not been injured by the foreign body, otherwise we would not be able to see the typical detachment after the lifting of the foreign body from its bed, and the latter would not be so easily done. Anatomic examination of injured eyes often shows that if the choroid be injured by a foreign body, which has simultaneously injured the retina, there is produced a marked proliferation of connective

tissue and synechiae, which connect the retina so fast to the choroid that their separation is impossible. In the present case, we see the detachment, tho small and only very transient. It gave a clear idea of the existing normal condition in the choroid, which at the same time could be seen thru the tear, showing no gross changes except slight edema, which might be due to the immediate effect of the extraction. In such an area of laceration, pigment changes are commonly seen, if the retina becomes reattached again. They are due to a migration of the pigmented epithelium into the crypts and folds of the retina, and ophthalmoscopically they appear as stripes. In our case, there was no pigment change in the fundus when the picture was made, but about a month later, we saw the typical pigment changes around the tear. At the beginning, the retina was stretched by the action of the magnet, and then the retina was lifted away from the choroid. But later on, after the reattachment had taken place, the retina became slightly retracted, due to the slight elasticity of the nerve fiber layer. This apposition of the detached retina to the choroid will facilitate the migration of the pigmented epithelium into this region, where we see the pigmented stripes. The retinal tear eventually becomes covered up by the connective tissue, and sometimes the diagnosis of such a tear may be rather difficult without the history.

In spite of a big tear in the detached retina, which certainly opened up a free communication between the vitreous cavity and the subretinal space, there was no further extension of the detachment; but on the other hand, it became reattached in a very short period of time. It is quite obvious that a simple tear in the retina alone, without other pathologic changes either in the retina or in the subretinal space, or most important of all in the vitreous body, is not sufficient to produce a detachment. But a tear in the retina will often predispose the retina to have a late detachment, if the vitreous should by any chance become more fluid in consistency, yet in some cases, such changes as synechiae may be formed between the choroid and the retina, and subsequently lessen the danger of its development.

### SPONTANEOUS LACERATION OF RETINA.

More often we see retinal laceration without any apparent cause as in the case of injury or hemorrhage, or any evidence of a retinitis proliferans. They are most commonly observed in myopic eyes with spontaneous detachment of the retina. With regards to the frequency of such tears, opinion varies. According to Leber[6], in every case of spontaneous and sudden detachment, a tear is to be expected. He, in a series of 27 cases of detachments, of which 12 were of more than two months duration, found ten tears among 15 recent cases and four tears in 11 cases of older standing, making a total of 4 cases or 51.8%. He had the opinion that even in a more slowly developing detachment, an anterior tear could not be excluded. In most of the cases, the tear was so peripherally situated, i.e., usually in the region of the ora serrata, that it could not be reached with the ophthalmoscopic examination. In other cases, the tear may be obscured by the folding of the detached retina, and in older cases, the edges of the tear may come into apposition again. Therefore the exact diagnosis may be sometimes very difficult. Deutschmann[7] on the other hand in a series of 539 cases, 75% of which were myopic eyes, only found tears in 17.4%.

There are many theories advanced, and each one tries to explain the exact nature of the tear and the idiopathic detachment; but each of them is more or less based on a particular case or a series of cases, and there seems to be no theory that will explain the mechanism of every case. Leber[8] believed there was a primary retinal tear in every case of spontaneous detachment. He thought in myopic eyes there is usually a slight inflammatory condition near the flat portion of the ciliary body which causes a proliferation of the epithelial cells of the pars cili-

aris and connective tissue formation, connecting the ciliary body to the inner layers of the ora serrata and the vitreous. By the contraction of these connective tissue strands the retina may be torn.

Heine,[9] after examining 120 cases of myopic detachment, concluded that the simple mechanism of stretching of these epithelial and connective strands will cause the tear. Gonin[10] found a migration of the pigmented and non-pigmented epithelial cells from the ciliary body in the periphery of the vitreous body. These epithelial bands will produce a traction on the retina. But since we know that the vitreous body is inserted to the pars ciliaris thru its base, it seems unlikely that the inflammatory cells, or especially the proliferating epithelial cells, can migrate into the retina thru the intact vitreous body, besides one never sees any real connective tissue strands at the edge of any retinal tear.

On the other hand, Hansen[11] in an anatomic study of sixteen myopic eyes only once found what could be said to be a hyperplasia of the pars ciliaris and of the pigmented epithelium. But five times did he find a marked cystoid degeneration in the region of the ora serrata. He concluded that the degenerative retinal changes, especially the cystoid formation, would be enough to explain the detachment of retina in the myopic eyes. In such a degenerated retina, a further slight trauma, even a cough or some physical exertion, or a slow circulatory disturbance, may cause the detachment of the retina, by a tear on such a spot. After the tear it is evident that the liquefied vitreous gains entrance into the subretinal space, and results in a serous detachment. Vogt[12] also found such cystoid degeneration in elderly people, similar to those found in the myopic eyes; and he considered that such changes appear earlier in the myopic eyes. This theory will certainly explain many cases of idiopathic retinal detachment, which are so frequently seen in old patients with a lower degree of myopia.

In a recent article, Löwenstein,[13] gives the opinion that in spontaneous detachment a retinal tear is not necessarily the only cause; because in many cases, we can not find the tear in spite of the most careful examination. He believes a retinal tear may be secondary to a detachment. As a matter of fact, the subretinal fluid usually contains more albumin than the liquefied vitreous, therefore it cannot be the same fluid, but rather a transudate directly from the choroidal vessels. This highly albuminous fluid may undergo a fermentative change, which may indirectly cause the retinal tear. Kümmell[14] observed that the hypotony of the globe usually proceeds the detachment. The hypotony which results from abnormality of both the retina and the choroid and a shrinkage of the liquefied vitreous body, may act as a suction on the uveal vessels, causing an active transudation into the subretinal space. Any difference in tension on both sides of such a highly degenerated membrane like retina could easily account for its laceration. But in such cases, we would expect a more insidious onset.

Clinically a spontaneous retinal tear appears as red or brownish red, in contrast with the detached grayish retina. Near the edges, the retina is usually edematous, and therefore looks whitish, but in cases of older standing, the entire area of the detached retina may become opaque. The details of the choroid sometimes may be seen thru the tear. The shape of the tear varies greatly. It may be very irregular, of half moon shape, angular or four sided, or slit like, but more frequently is of a typical horseshoe shape. The tear may be localized in any part of the retina. But the periphery, especially near or at the ora serrata, is the place of predilection. Thus Nordenson[15] collected 46 cases of retinal tears, and found in eleven cases the tear was in the lower half of the retina, and in one case it was situated nasally and below. In very exceptional conditions a vessel may escape from being torn, and in such case it bridges over the hole. Such cases were reported by Leber,[16] Lister,[1] and Krauss[17]. The

following case also had a retinal vessel passing thru the tear; and it represents a typical picture of a tear in a detached retina.

26-4698.—A. K., a woman of 62 came to Prof. Meller's clinic 27th of July, 1926, complaining of sudden impairment of vision of the left eye for four weeks. Since that time, she saw as thru a fog, except if she turned her head to the right. All the objects appeared to be more or less crooked to her.

Vision. R. E. 6/36, —1.50 —0.75 c. ax. 180° = 6/12. Reading with + 1.5, Jaeger II.

L. E. 6/60, —4.0 —1.0 c. ax. 90° = 6/24. Read Jaeger I. with difficulty without correction.

Fundi. R. E. Normal.

L. E. Cataract incipient. There was a circumpapillary atrophy, and on the temporal side some pigment spots. The macular region showed slight senile pigment change, and peripherally some signs of an old choroiditis. Temporally and above, about two P. D. from the macular region was a typical, circumscribed detachment, grayish blue in color, with many folds in the retina. The vessels appeared dark, and were more tortuous than the rest. Near the upper border of the detachment was a tear (Fig. 2). It was slightly curved towards the periphery, and about 1 P.D. in length. The tear was perpendicular to the course of the vessels. Near the center of the tear was an uninjured vessel passing over it, like a bridge.

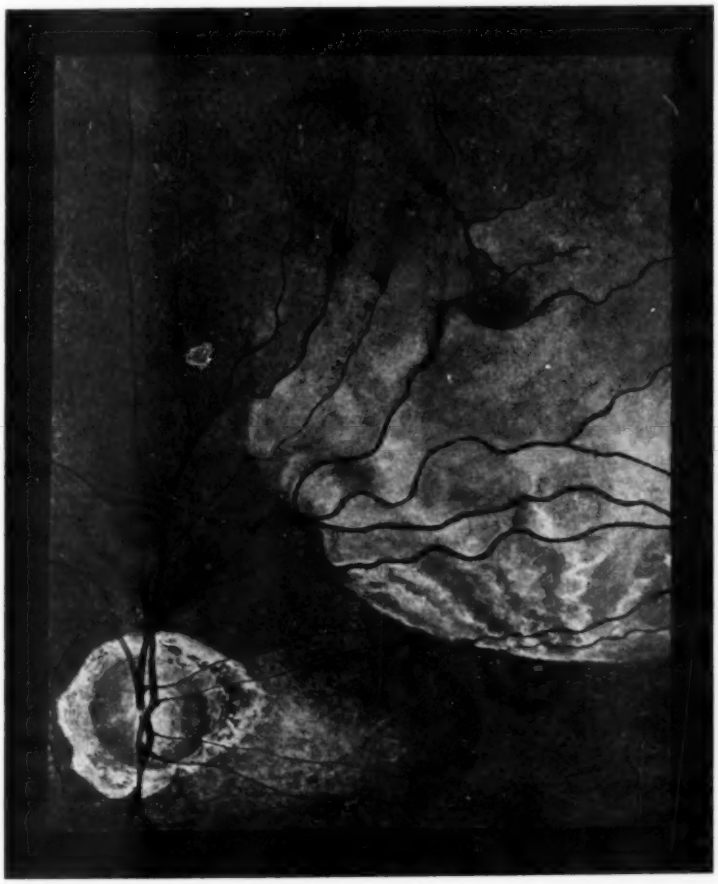

Fig. 2.—Circumscribed detachment, with tear perpendicular to course of vessel crossing it.

Eight months later, 21st of March, 1927, reexamination of patient, showed no change subjectively. The detached part of the retina had become transparent, and the detachment was only made out by parallactic displacement. and the tear was not visible. Further below, towards the horizontal line, the retina began to show slight cloudiness and the detachment seemed extending downwards.

Retinal laceration with an intact vessel is a very rare condition. We should think that the presence of a vessel would make the retina more difficult to become torn, and the tear if present in such a region would be more or less parallel to the course of the vessel and the nerve fiber layer. But we must consider the underlying degenerative changes in such a retina. Both the senile and the myopic cystoid changes will play an important role in its development. By the confluence of the cysts, the retina may become so thin, that only a layer of the membrane limitans interna is left to cover a big cyst. Therefore any slight force or exertion which is sufficient to rupture this membrane like retina would not be strong enough to tear apart a normal vessel. After a communication has been established, the detachment of the retina is only a matter of time, in such a highly degenerated eye.

In a more recent retinal detachment, the retina is edematous, and therefore looks grayish opaque. But later, after the disappearance of the edema, the retina may once more become transparent, because it now undergoes atrophy. The diagnosis will sometimes be very difficult, especially when we have to deal with a flat detachment. In a long standing case of retinal tear, the hole may be entirely obscured as in our case. A tear is only visible when it makes a contrast with the surrounding opaque detached retina. It may become obscured when the retina becomes transparent again, so that we loose the contrast, or if the retina becomes reattached, we also loose the contrast. This is probably why we find such a small percentage of tears in myopic detachments, nevertheless, we have to assume that a retinal tear is the immediate cause of the sudden myopic detachment.

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# MIKULICZ DISEASE TREATED BY X-RAY.

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This is the report of a case, with mention of another, in which exposure to X-ray was followed by recovery. The cornea ulcerated from exposure making necessary removal of tissue and tarsorrhaphy. The untreated salivary glands remained enlarged. Reported from the Government Ophthalmic Hospital, Madras.

C., Hindu, male, aged 60, came to hospital on 16-5-1924 complaining of swelling of the lids. He stated that the condition started 9 months before in the right eye, subsequently the left became swollen. On examination the right eye was markedly proptosed and the cornea ulcerated from exposure. The globe was pushed forwards and inwards by a mass which occupied the superior, outer and inferior aspects of the orbit. The bulging was most prominent under the upper lid in the superior temporal region. Edematous folds of conjunctiva presented in the palpebral aperture (see stereoscopic photograph). The condition was obviously due to a solid enlargement of the lacrimal gland. On the left side there was a similar condition very much less extensive. The submaxillary glands were the only other glands enlarged. The blood picture showed no evidence of white cell disturbance. There was no evidence of syphilis.

Fig. 1.—Right lid inverted showing enlarged lacrimal gland. Left lid swollen but less so. For stereoscopic effect see directions for plate 9.

A similar case in the previous year had greatly improved subsequent to X-ray treatment. But it could hardly be regarded as uncomplicated, inasmuch as the patient had syphilis and was treated for that disease at the same time as the X-ray exposures were given. Syphilis was excluded in the present case, and it was determined to try the effect of X-rays alone. The cornea was carefully attended to and exposures were started on 23-5-1924. Details are given below.

At first the corneal ulcer improved, but after a time it extended, and it was considered advisable to close the lids

by a partial tarsorrhaphy; the operation was performed on 7-6-1924. To ensure union of the lid margins it was necessary first to do an external canthotomy and remove a portion of the enlarged gland, sufficient to allow the lids to come together without tension. A piece was shelled out about the size of a filbert, the lids stitched together in their outer two-thirds and the canthotomy wound closed. The tissue removed was fixed and hardened (specimen A). Exposures were then continued and apparently with good effect. Even if diminution of the growth on the right was masked by the partial removal, the enlargement on the left side steadily diminished. The cornea too was healing rapidly.

Fig. 2.—Appearance after two months x-ray treatment of both eyes and removal of tissue from upper lid of right.

As there was much redundant tissue in the upper lid it was decided to remove a wedge of the thickened conjunctiva. On 28-6-1924 the lids were separated and a wedge of tissue removed from the deep surface where the conjunctiva was very massive and folded transversely on itself. The opportunity was taken of obtaining another specimen of the growth which was fixed and hardened (specimen B). A median tarsorrhaphy was now performed, as it was considered safer for the patient to have the cornea protected for a time. On 14-7-1924 the patient was discharged; the cornea by this time had healed and the swelling of the lacrimal glands practically gone (see photograph). The submaxillary glands had not altered since his admission.

When specimen "A" was examined it showed a lymphoblastomatous type of growth. There was no apparent arrangement of the round cells which were of a lymphoid type and the stroma was very scanty. Blood vessels were capillary in type. There was delicate capsule of connective tissue, no evidence of lacrimal gland structure and no amyloid change.

Specimen "B" was very similar except that the capsule was thicker and fibrous trabeculae with larger vessels had made their appearance. Homogeneous degeneration had appeared in the deeper layers of the capsule, along

the trabeculae and around the vessels, which in the latter situation gave characteristic amyloid staining.

DETAILS OF X-RAY TREATMENT.

23-5-1924. Right eye ½ B. dose thru 1 mm. filter at normal distance.

23-5-1924. Left eye ½ B. dose thru 1 mm. filter at normal distance.

30-5-1924. Right eye 1 B. dose thru 2 mm. filter at normal distance.

30-5-1924. Left eye ½ B. dose thru 2 mm. filter at normal distance.

28-6-1924. Right eye 1 B. dose thru 2 mm. filter at normal distance.

1-7-1924. Right eye 1 B. dose thru 2 mm. filter at normal distance.

5-7-1924. Right eye 1½ B. dose thru 1 mm. filter at normal distance.

12-7-1924. Right eye ¾ B. dose thru 1 mm. filter at normal distance.

For this statement of treatment I am indebted to Capt. T. W. Barnard, radiologist, Government X-ray Institute, Madras, where the exposures were given.

# GLAUCOMA FOLLOWING OBSTRUCTION OF CENTRAL VEIN OF RETINA.

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Glaucoma following some weeks after obstruction to the central vein and hemorrhage into the retina has been called hemorrhagic glaucoma. A case is reported seen at the time of venous obstruction and three months later with glaucoma, for which the left eye was enucleated. Six months later the other eye was affected and the patient treated for high blood pressure. The eye quickly improved and no glaucoma had occurred after more than a year. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July 22, 1927.

This unusual condition was first described by von Graefe. He noted that the sequelae of venous obstruction, followed by acute glaucoma, occurred too frequently to be regarded merely as a coincidence. The symptom complex is alluded to in text books as "hemorrhagic glaucoma." As the exact cause of the glaucoma in these cases is unknown, it seems that this name should be reserved for those cases in which increase of tension is definitely caused by intraocular hemorrhage, as in cases that follow trauma.

The two questions that immediately confront the clinician are: first, what is the cause of the venous obstruction; second why does glaucoma ensue in a comparatively large number of cases. Both of these questions present great difficulties and are to a large degree unsettled. Parsons[1] suggests the following possibilities to account for the clinical picture known as "thrombosis of the central vein." 1. A thrombus in the central vein. 2. Occlusion of the central vein by proliferation of the intima without thrombosis. 3. Multiple thrombi in the retinal veins without a thrombus in the central vein. 4. Multiple emboli or perhaps thrombi in the central arteries. 5. Changes in the retinal vessels (hyaline thickening, endarteritis, endophlebitis) sometimes amounting to occlusion, but not the result of either thrombosis or embolism. 6. Hemorrhages into the substance of the optic nerve. It seems very doubtful if (4) and (6) should be listed among the possibilities. The same authority states that the favorite site for formation of a thrombus is at the lamina cribrosa, or just behind it, for the reason that the vein is narrowest at that point. Von Michel says that another favorite site is where the vein leaves the optic nerve. But his case and that of Yamaguchi are the only two on record, of thrombosis at this location.

Undoubtedly angiosclerosis is present in the vast majority of cases, usually accompanied by vascular hypertension. This can not be the sole reason, however. I have seen a typical case in the eye of a young man of 28 with no evidence of retinal angiosclerosis, but with a blood pressure of 142/92, and another in a luetic woman of 21 with a blood pressure of 110/75 mm. We see great numbers of persons with retinal angiosclerosis that do not develop thrombosis. R. Foster Moore is convinced that a frequent cause of thrombosis in a tributary vein is the crossing of the vein by a thickened artery.

Verhoeff reports six cases of obstruction of the central vein that he had examined in serial cross section, and in the same article he carefully analyzes the descriptions of the thirty-nine cases that had been previously examined anatomically. He concludes that in no case on record was there indisputable evidence that a true thrombosis had occurred. Verhoeff is convinced that endophlebitis obliterans is responsible for the symptom complex commonly called thrombosis of the central vein. This seems the only possible explanation for the condition in young persons who show no evidence of retinal angiosclerosis. Feingold in his discussion of Greenwood's paper[4] dealing with this subject, stated that there are probably some cases of obstruction due to endophlebitis obliterans, others due to actual throm-

bosis. In either case there is a disease of the vessel walls and the name thromboangeitis obliterans suggested by Burger[6] would seem to describe the situation sufficiently well for clinical purposes.

The answer to the second question is more difficult than the first. Histologic examination does not settle it and it is necessary here to offer theories rather than facts. Glaucoma follows obstruction of the central vein in approximately one-fourth of the cases. Moore[2] noted it in twenty-three per cent, where glaucoma was unquestionably due to the obstruction. The average length of time intervening between symptoms of obstruction and those of glaucoma was eighty days. In my case the interval was eighty-two days.

The reason for ocular hypertension, then, is not the increase in the contents of the vitreous chamber from hemorrhage, or transudation of blood plasma. In fact, the tension in an eye that suffers obstruction of the central vein is lower than normal for some time. Coats' explanation that it is caused by an increase in the albuminous contents of the aqueous so that it passes thru the filtration angle with difficulty is scarcely tenable, because as Moore[2] explains, an increase in tension would be expected in all cases of thrombosis. Also thrombosis of a large tributary should occasionally at least produce glaucoma. This does not seem to be the case.

Magitot and Bailliart[5] have recently emphasized the fact that the intraocular tension depends to a great extent upon the pressure in the choroidal veins. That any marked obstruction to the outflow from such a large network of veins causes an increase in intraocular tension is certainly true. One is tempted to theorize that, inasmuch as from two to three months usually elapses between obstruction of the vein and onset of hypertension, perhaps the organization of exudates and hemorrhages into the retina produces a secondary contracture in the choroidal veins, but I have no anatomic evidence to offer in favor of this. That the obstruction is in the choroid rather than at the filtration angle seems to me to be borne out by two facts:

1. A feltwork of vessels always becomes apparent in the iris in these glaucomatous eyes.
2. The operations that relieve acute glaucoma of the usual type are as a rule of little benefit in the type of cases under discussion.

It is quite probable that if the retinal vessels are sclerotic or the seat of endophlebitis, the choroidal vessels will be affected by the same processes. The increased tension then may be independent of the obstruction to the central vein and be caused by obstruction in the veins of the choroidal plexus or venae vorticosae. This seems to me the most plausible theory, or at least the one open to fewer objections than any other.

The following case came under my observation and as it is rather typical in all its phases of the subject under discussion it is briefly reported.

Case. Mrs. H. F. E., 61, consulted me July 14th, 1925. Four days previously she had discovered that she could see very little with her left eye. Ophthalmoscopic examination showed great swelling of the disc, enormous dilatation of the retinal veins, obliteration of the arteries, numerous hemorrhages along the course of the veins and several areas of exudate; a typical picture of socalled thrombosis of the central vein. Vision was reduced to counting fingers at two feet. The right eye was normal except the retinal vessels showed a well marked angiosclerosis.

No complications ensued until October 1st, when a throbbing pain began in the affected eye. She appeared on October 3rd with a red and painful eye. The pupil was dilated and fixed, the vision was reduced to light perception. The cornea was steamy, but the anterior chamber was not shallowed. Tension was 60 mm. (McLean). She was treated with miotics, hot applications, light massages, subconjunctival injections of epinephrin, rest in bed, etc. The pupil contracted very little

and tension never fell below 50 mm. altho for several days she was quite comfortable. October 31st a feltwork of vessels could be easily seen with the corneal microscope, using slit lamp illumination. The tension rose to 70 mm. and a bullous keratitis developed. Enucleation was done November 3rd.

The only two factors in her previous history that might have a bearing on the case were a severe right sided pyelitis a year previously and a moderate vascular hypertension (160/90). She had at the time of operation a faint trace of albumin in the urine and an occasional granular cast. Before the patient left the hospital her visual field was taken. It showed a normal field for form and a moderate concentric contraction for colors. The tension taken in the right eye on several occasions was always well within the normal limits.

April 10th the patient returned complaining that her near vision was blurred. There were numerous small hemorrhages scattered thruout the retina, mostly in the fiber layer. Alarmed over the possibility of disaster to the second eye, she agreed to consult an internist concerning her condition. His findings in brief were: blood pressure 200/116, periapical abscess of first lower left bicuspid tooth; urine free from albumin, with an occasional cast upon repeated examinations. She had, however, a marked lowering of chlorid excretion—about one-half the normal amount. Her phenolsulphonapthalein test gave an excretion of 40.6% first hour, 13.9% second hour. The blood chemistry examination was as follows: nonprotein nitrogen 29.5: urea nitrogen 13.5: creatinin 1.01.

The results of the other laboratory and clinical examinations were unimportant. Her condition seemed to be the socalled "essential hypertension" with chlorid retention. Her sole treatment consisted in a salt free diet, restriction of protein to 2/3 gram per kilogram of body weight and extraction of the infected tooth. A month later her blood pressure was 130/80 and the hemorrhages had disappeared from the retina. Upon being permitted the use of salt in her food the blood pressure soon arose again. She is now resigned to a very restricted salt intake and her blood pressure remains at 130/80.

I am indebted to Dr. W. C. Finnoff, who sectioned the eye, for the following description: Specimen of Mrs. H. F. E. (No. 333). The globe was of average size. The optic nerve was cut flush with the globe. Sections were embedded in celloidin and sectioned serially. The sections were stained with hematoxylin and eosin, and Van Gieson's stain.

*Microscopic Examination.* Excepting for edema of the corneal epithelium and several small vesicles of the epithelium, the cornea is normal. The anterior chamber is shallow. To the periphery the iris is in contact with the posterior surface of the cornea for a distance of 1.5 mm. (peripheral anterior synechia). The iris in the region of the synechia is slightly atrophic and thinned. The iris vessels are thicker than normal and the stroma is more compact than in the healthy eye. The ciliary processes are partially atrophic and present the typical appearance of advanced glaucoma. There are no pathologic changes in the vitreous.

The retina shows varying stages of degeneration. The ganglion cells have entirely disappeared in many places, and are markedly diminished in number in other portions of the retina. There are several extensive hemorrhages in the nerve fiber, in the inner nuclear, inner reticular and outer reticular layers. Several small cystic areas are present between the nuclear layers.

The changes in the walls of the blood vessels are striking. The veins and arteries are markedly thickened. The thickening has occurred chiefly in the media, altho in several sections a proliferation of the endothelium has occurred. The thickening of the walls of the blood vessels has resulted in a narrowing of the lumen. One of the main venous trunks, near the disc (1 mm. from the edge of the disc) is

completely occluded. The media of the vessel wall at the point of obstruction is markedly thickened, and the endothelium is three layers deep. Peripherally to the obstruction, the hemorrhages in the retina are more pronounced. A flat subretinal hemorrhage, 1 mm. long, is present at the margin of the disc on the temporal side. The choroidal vessels have thickened walls, and are markedly congested.

The optic nerve is moderately cupped. The cup is deepest on the nasal side, where it shelves inward. In this portion the vessels are under the scleral margin of the optic canal. The lamina cribrosa is bowed backward. The vessel walls are markedly thickened, but show no evidence of complete obstruction. The nerve was cut flush with the globe and a study of vessels behind the lamina cribrosa was impossible for this reason. The nerve is in a high state of atrophy and shows several cavernous spaces. (Schnabel's caverns.)

Diagnosis: Hemorrhagic glaucoma with endothelial thrombosis of one of the main venous trunks.

In the Boston Medical and Surgical Journal May 19, 1927, Blaisdell reports a case in which on a salt free diet the blood pressure fell from 180/115 to 120/80. He broke his diet and within twenty-four hours a thrombosis of the central vein developed with an abrupt rise in blood pressure. The treatment of this unfortunate complication is very unsatisfactory. Bull, according to Casey Wood, advises careful paracentesis of the anterior chamber, followed by miotics. Zentmayer[4] states that cyclodialysis may obviate the necessity of enucleation; and O'Connor, in the same discussion, reports good results from a Curran operation, in a case of glaucoma that may have been hemorrhagic in origin. De Schweinitz states that he has seen good results from filtering operations. Gradle[7] has recently described an operation that might be successful in this condition. Greenwood[4] advises the use of vasodilators, sweats, miotics and rest in bed in all cases of obstruction to prevent the onset of glaucoma. Iridectomy in this type of glaucoma is a dangerous procedure.

As one is dealing with an eye in which vision is poor because of the previous venous obstruction, the matter of loss of sight from hypertension does not need to be given much consideration. For this reason one may temporize longer than in primary glaucoma. Indeed the patient's comfort is the chief desideratum. However, any operative measure for relief of tension should be done before degenerative changes set in, if at all. Most of these eyes have to be enucleated ultimately, and careful consideration must be given to the physical condition of these patients. They are usually elderly persons and do not bear pain well. It is probably better in the majority of cases of this type to enucleate, after conservative methods of treatment fail, rather than to subject the patient to various operative procedures in hope of retaining a blind eye.

The prompt fall in blood pressure and rapid disappearance of retinal hemorrhages, when salt was removed from the diet of the case reported, suggests that these patients should be given the benefit of a careful study of the chemistry of the blood and urine. As any cases of marked angiosclerosis of the retinal vessels is a potential case of "venous thrombosis," such a catastrophe might be avoided if the patient was referred to an internist who would make such a study and regulate the patient's life accordingly.

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# ROUTINE EXAMINATIONS OF THE OCULAR MUSCLES AND NONOPERATIVE TREATMENT.

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Routine tests of ocular coordinations are neglected. Record forms are suggested and the routine examinations are described. Standards are shown by statistics. Prism exercises are prescribed and printed directions given for them. Such treatment gives relief from asthenopia in many cases, and may obviate the need for operations. The data here published form the basis for a lecture in the Instruction Course of the American Academy of Ophthalmology and Oto-Laryngology, Detroit, September, 1927.

That a routine examination of the ocular muscles in all patients with asthenopic symptoms is desirable, is conceded by most ophthalmologists, but many men doubt the practicability of making this examination in busy offices and over crowded clinics. We are willing to concede that it is frequently impossible, owing to overcrowding and under-manning of clinics, to carry out such examinations, altho we know that this can be done when the clinics have their full quota of medical and lay assistants. That examinations of the eye muscles are seldom made routinely in clinic practice has been previously reported by us.[1]

In a study of the records of eleven eye clinics, ten in New York and one in Boston, made with the assistance of Doctor G. E. Sturges of the Associated Out-Patient Clinics of New York, we found statements in regard to the ocular muscles in only 0.44% of the records examined, and nonsurgical muscle treatment was suggested in no case. These figures are startling when we realize that we considered a muscle examination as having been made when the bare statement was recorded that the patient had an esotropia of approximately thirty degrees.

If our contention is correct, 84.5 per cent of the patients who consult us complaining of ocular fatigue have some disturbance of the neuromuscular functions, which, if not the sole cause of their complaint, at least adds to their discomfort. We are convinced that we are not giving our patients the benefit of our best judgment, if we neglect the examination of the ocular muscles in clinic and office practice.

Some ophthalmologists, even in their offices, feel satisfied in making muscle examinations of patients only when they return complaining of discomfort after they have worn their lenses for a short time. We cannot understand how lenses can be scientifically prescribed without having some knowledge of the muscle balance and muscle strength, for we have found no constant relationship between myopia and convergence insufficiency and hypermetropia and convergence excess. We have found that the relation between convergence and accommodation is not as fixed as some authors have taught, but that marked individual variations exist. How an ophthalmologist can expect to make a presbyopic patient with marked convergence insufficiency or paresis comfortable by adding more sphere for close work, or a patient with divergence excess and hypermetropia more comfortable by making him wear, for constant use, the strongest plus spheres he will accept, is difficult for us to understand. We believe that if the muscle balance is carefully studied and appropriate exercises or other form of treatment instituted, for example, the discovery and elimination of underlying causes of fatigue, the patient in many instances will not require lenses. We believe that a record form to be filled in is of value, altho we know that this method has some disadvantages. The form that we use, both in clinic and office practice is the same, altho we realize that in most clinics it is impracticable to make as complete an examination as is made in our offices, except after briefer examinations disclose muscle imbalance.

In making these examinations we find a complete history important. In clinic practice we believe it is sufficient for the purpose of detecting gross muscular disorders to make a brief examination after the history has been taken and the distant vision recorded, with and without lenses. We confess that we have not in the past determined the near point of accommodation in each eye separately and in both eyes together in clinic practice, altho we believe it is important. In clinic practice we make the following tests which will be described in detail when we consider the office routine. The tests are: the screen and parallax test for 6 meters and 25 centimeters, and determination of the near point of convergence, and near points of accommodation. We believe by these tests that we can usually determine the presence of the following muscular disorders; convergence insufficiency, and excess, and divergence insufficiency and excess, as well as heterophoria and heterotropia, the result of these conditions or the result of pareses or paralysis.

Our routine office examination of the eye muscles is as follows:

1. Visual acuity right and left eye without lenses.
2. Pinhole vision without lenses right and left eye.
3. Vision, right and left eye with correction.
4. Interpupillary distance, (Pd) determined for distance.
5. Near point of convergence. (Pc.) We use the near point of convergence to the cornea rather than the near point of convergence to the base line joining the centers of rotation of the eyes, or "Pc. B." It seems less confusing and less time consuming in office practice, and if one wishes to determine the Pc. B. this is simple, having determined and recorded the interpupillary distance. Our procedure is to hold a millimeter scale with its nasal extremity touching a line tangent to the apices of both corneae. Any small object or two millimeter black dot or a half millimeter vertical black line is held about thirty-three cm. away, in the median line, above the edge of the rule and the patient is instructed to look at it intently. If both eyes converge upon the line or dot, it is then carried in the median line toward the root of the nose along the edge of the rule. The patient's eyes are carefully observed and the point noted when either eye, or both eyes deviate outward, or the patient notes diplopia; this point in millimeters is the near point of convergence. We find that the near point of convergence (Pc.) varies in adults from 40 to 80 mm. and in children under 10, with normal muscle balance, from 30 to 70 mm., and believe that insufficiency exists if, after repeated trials, the near point of convergence exceeds these figures. In computing the angle of convergence the following formula may be used:

$$\frac{Pd\ 50}{Pc + 12} + 3 = C \text{ (convergence angle)}$$

The convergence angle should be from 35° to 55° in adults, and in children 60° to 63°.

6. P. P. R. and L. (near point of accommodation in the right and left eye). This is determined separately for each eye by requiring the patient to observe, in a good light, Jaeger test type No. 1, gradually bringing the card toward the uncovered eye until the first sign of blurring of the print is noted. The test is then applied with both eyes open and uncovered. A narrow line as a test object, as suggested by Duane[2] possibly makes this test slightly more accurate.[3] The distance of this point from the anterior surface of the cornea, measured in millimeters, is the near point of accommodation. Always note whether reading is made with correction (c. C.) or without correction (s. C.). Note thus, P. P. R., c. C., J. No. 1 at 300 mm. P. P. L., c. C., J. No. 1 at 300 mm. O. U. 280 mm.

We have frequently noted a marked approximation of the near point when both eyes accommodate, and failure to study accommodation with both eyes open may be the reason why our patients sometimes complain that their reading lenses are too strong, altho

in rare instances we have noted marked recession of the binocular near point as compared with the monocular, so that both tests should always be made.

7. Tests of muscle balance and prism vergence for six meters and 25 centimeters. Routine muscle examination should be made with and without reading lenses and distance lenses, but in practice to save time at the first examination, we usually note the findings with the lenses the patient has been wearing; a note is made as to whether lenses were worn or not. It is important to note whether or not prisms are being worn.

ABBEVIATIONS USED.

Pd = Interpupillary distance.
X = Exophoria at 6 M.
E = Esophoria at 6 M.
H, R or L = Hyperphoria (Right or Left, cross out the one which does not apply).
T = Heterotropia. $^{T}$ is added to X, E, and H to designate heterotropia, thus $E^{T}$ = Esotropia.
Div. = Power of prism divergence.
Con. = Power of prism convergence.
Prime mark (′) = near (Thus X = $2^{\Delta}$ X′ = $3^{\Delta}$).
C = Convergence angle.
P. P. = Near point of accommodation.
s. C. = Without correction.
c. C. = With correction.
Pc. = Near point of convergence.
Pc. B. = Pc. to the intercentral base line.

SCREEN TEST. To determine the presence of heterotropia, ask the patient to fixate a small object at 6 meters, cover each eye separately, see if both are simultaneously fixating. If one or the other fixates alone there is heterotropia. Repeat procedure with patient fixating object at 25 cm.

SCREEN AND PARALLAX TEST.

1. One should have a 1 cm. light, 6 meters from the patient on a flat black or neutral background. A one or 2 cm. black spot on a light background or, in fact, any small object may be used.

2. With the patient fixating the distant object, shift a small card from eye to eye deliberately, making sure the uncovered eye fixates. If the eye moves in to fixate when uncovered, exophoria or exotropia exists. Hold prisms base *in* before either eye and increase strength of prism until the eye moves the other way subtracting $2^{\Delta}$ unless it is a small amount—below $5^{\Delta}$ for instance—then only take $1^{\Delta}$ away. Record findings in prism diopters.

3. If esophoria or esotropia is present, the eye is turned in under the screen and moves temporally to fixate the test object when the card is shifted. Prisms are placed base out until the movement is reversed, the same amount is subtracted as for exophoria or exotropia.

4. If hyperphoria or hypertropia exist, just stop the vertical movement by a prism base up or down as indicated, and this is the correction. If vertical is associated with horizontal imbalance, correct the horizontal movement by a prism, and then correct the vertical imbalance by superimposing square prisms. When vertical imbalance is corrected in this way, it will sometimes be found that the horizontal imbalance is overcorrected.

SCREEN AND PARALLAX TEST FOR 25 CM. The patient is asked to fixate a 1 mm. black dot on a white card and a small card is shifted deliberately from eye to eye. Prisms are used and findings recorded as for 6 meters, making the same subtractions. We believe the screen and parallax test gives us the most useful information in regard to muscle balance for it more nearly approximates reading conditions as the patient accommodates on a small dot. It has the added advantage of being an objective test.

We supplement this test by the use of the Maddox rod and screen test. The patient is asked to fixate a 5 mm. source of light at 6 meters. A red or white tested[4] Maddox rod is placed with its corrugations directed horizontally over the eye which is not the master, or sighting eye, as by this means, according to Dolman[5], a greater amount of heterophoria was elicited in

68% of cases. This eye is then screened for several seconds, and the screen is momentarily removed. If the Maddox rod is over the right eye and the line of light is to the left of the point of light, exophoria or exotropia is present; if the line is to the right, esophoria or esotropia. Prisms are placed base in, in exophoria, and base out in esophoria until the line and light are superimposed; the deviation is recorded in prism diopters. The Maddox rod is now turned with corrugations vertical, producing a horizontal line; if it is below the light there is right hyperphoria or right hypertropia. To detect malingering a prism may be held base in or out over the Maddox rod before the nonfixing eye is unscreened. This procedure is then repeated at 25 cm.

PRISM DIVERGENCE FOR 6 M. AND 25 cm. We prefer square prisms in racks for determining prism divergence and prism convergence for two reasons, first because the eye can be observed, and second, because the muscle strength may be quickly determined. Hold prisms base in, increasing in strength until the object fixated becomes double. The prism may be held over the right or left eye or divided, using part before each eye. We frequently induce slight hypertropia by tilting the prism to see if the patient is fusing. The strongest prism thru which he can still maintain binocular single vision is recorded in prism diopters.

PRISM CONVERGENCE FOR 6 M. AND 25 CM. Square prisms are placed base out while the patient fixates first at 6 M. and then at 25 cm. The strongest prism thru which binocular single vision can be maintained is recorded in prism diopters. Patients whose convergence is apparently very weak for distance may do better if they fixate a small test object at 25 cm. and then slowly raise their eyes to the distant object. These are all the routine tests made at the time of the first examination, and they should be made in from 5 to 10 minutes. We think our findings are more accurate when using square prisms than when using rotary prisms, for the eyes may be observed. Higher readings are usually obtained with rotary prisms.

In addition to the tests described which are used routinely on all patients, we have been using sonamed fatigue tests of convergence and accommodation in practically all our patients who complain of asthenopia.

So far, we have obtained more valuable clinical data from the study of convergence fatigue but this is possibly due to the fact that this part of our study has received more critical attention. Most of our information has been obtained from the use of the ophthalmic ergograph and one of the records made with this apparatus may be seen by consulting table 1.

Approximately the same data may be obtained without apparatus, as has been previously described.[6] One of the tests we use almost routinely in patients complaining of ocular fatigue is the following:

NEAR POINT TESTS.

*Fatigue of convergence* by prolonged sustained effort at fixation:

Carry a pin towards the root of the patient's nose, on a level with his eyes, until it is difficult to maintain binocular fixation. Hold the pin in this position for one minute, while urging the patient to maintain binocular fixation. Note his ability to maintain steady binocular fixation; symptoms of discomfort complained of by the patient; and recession or approximation of the near point.

Study of these three factors frequently gives valuable information as to the quality of a patient's convergence. Binocular vision should be maintained without great effort, and should be fairly steady. The patient should not complain of marked discomfort. Normally the near point approaches the eyes or remains stationary, but muscles which fatigue easily may show recession.

Patients frequently complain that the effort hurts their eyes, and that after the test their eyes feel strained just as they do after close work. We believe in these cases converging exer-

cises with a pin or dot, or with prisms, are generally indicated, and usually prove beneficial, altho some underlying cause, such as sinus disease, may have to be treated before improvement will be noted.

We sometimes find that patients with normal muscle balance and strength, as tested by the usual routine methods, show fairly rapid onset of fatigue, and are benefited by exercises, also patients who have no uncorrected refractive error.

### ORTHOPHORIA.

In order that we may interpret our findings we should know what the normal muscle balance and muscle strength are.

We examined the ocular muscles of 223 men[8] with 20/20 vision with correction, not complaining of their eyes, and who were healthy in other respects. The average age of these men was 24.5, the oldest was 35.25, and the youngest 19.6 years. Their diagnoses were recorded as emmetropia, 64.57%; hypermetropia, 25.15%; myopia, 2.24%; comp. myopic astigmatism, 1.34%; convergence insufficiency, 2.24%; myopic astigmatism, 0.9%; all other types, 4.37%. The manifest hypermetropia averaged 0.57D. The interpupillary distance averaged 63.49 mm.; high, 78 mm.; low, 55 mm. The near point of convergence averaged 47.3 mm.; high, 115 mm.; low, 20 mm. The near point of convergence and the puncta proxima were studied in relation to age, yielding the following data:

TABLE NO. 1.—ROUTINE MUSCLE EXAMINATION.

| | | Near Point Convergence | | | Near Point Accommodation | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Right Eye | | | Left Eye | | |
| Age | Subj. | Average | High | Low | Average | High | Low | Average | High | Low |
| 20 | 3 | 36.67 | 45 | 30 | 81.67 | 90 | 65 | 80. | 90 | 65 |
| 21 | 8 | 45.875 | 80 | 27 | 96.875 | 110 | 80 | 95.625 | 110 | 75 |
| 22 | 44 | 45.25 | 70 | 20 | 104.55 | 130 | 80 | 102.95 | 130 | 75 |
| 23 | 44 | 47.4 | 100 | 25 | 102.57 | 130 | 85 | 103.4 | 130 | 85 |
| 24 | 29 | 48.86 | 110 | 30 | 102.1 | 130 | 60 | 100.9 | 130 | 85 |
| 25 | 31 | 49.645 | 115 | 30 | 104.68 | 140 | 80 | 103.74 | 140 | 80 |
| 26 | 21 | 46.24 | 65 | 25 | 93.24 | 120 | 65 | 90.7 | 110 | 60 |
| 27 | 9 | 48.33 | 65 | 30 | 105.22 | 140 | 85 | 108. | 145 | 90 |
| 28 | 10 | 50.3 | 80 | 30 | 107.5 | 150 | 80 | 106.5 | 150 | 80 |
| 29 | 5 | 46. | 80 | 30 | 110. | 120 | 100 | 110. | 120 | 100 |
| 30 | 5 | 41. | 35 | 30 | 108. | 120 | 100 | 107. | 120 | 95 |
| 31 | 3 | 66.67 | 80 | 60 | 106.67 | 130 | 80 | 106.67 | 130 | 75 |
| 32 | 4 | 38.75 | 45 | 30 | 112.5 | 130 | 85 | 112.5 | 130 | 85 |
| 35 | 2 | 37.5 | 40 | 35 | 102.5 | 110 | 95 | 102.5 | 110 | 95 |
| | 5* | | | | | | | | | |
| Averages 218 Men | | | | | Averages 218 Men | | | | | |
| 26.64 | 218 | 46.32 | 115 mm. | 20 mm. | 102.72 mm. | 150 mm. | 60 mm. | 102.24 mm. | 150 mm. | 55 mm. |

The average muscle findings at 6 m. of these 218 men were: Diverging power, 5.82$^{\Delta}$; converging power, 14.1$^{\Delta}$; supraverging power, 2.54$^{\Delta}$; exophoria, 1.5$^{\Delta}$; esophoria, 1.43$^{\Delta}$. At 25 cm. diverging power, 16.47$^{\Delta}$; converging power, 38.02$^{\Delta}$; supravergence, 2.57$^{\Delta}$; exophoria, 5.32$^{\Delta}$; esophoria, 2.5$^{\Delta}$.

*No record.

In three hundred consecutive cases in which a complete muscle examination had been made in our own practice, one hundred and four were selected as having normal muscle balance according to the following arbitrary standards for orthophoria:

1. The near point of convergence must not exceed 100 mm.*;
2. The muscle balance at 6 meters must not show more than $3^{\Delta}$ of esophoria, $2^{\Delta}$ of exophoria, or $1^{\Delta}$ of hyperphoria;
3. The muscle balance for 25 cm. must not reveal more than $6^{\Delta}$ of exophoria, $1^{\Delta}$ of esophoria or hyperphoria. As a rule the tests were made with a Maddox rod.

The following results were obtained:

1. Age: Varied from 6 to 65 years, average, 32.58 years.
2. Pd: Varied from 53 mm. to 70 mm., average, 62.87 mm.
3. Pc: Varied from 32 mm. to 100 mm., average, 63.5 mm.
4. The muscle balance at 6 m. varied between the limits set:
   26 cases had esophoria, average $1.13^{\Delta}$.
   23 cases had exophoria, average of $1.26^{\Delta}$.
   2 cases had hyperphoria, average $.75^{\Delta}$.
   53 cases had orthophoria.
5. The muscle balance at 25 cm. varied between the limits set:
   6 cases had esophoria of $1^{\Delta}$.
   79 cases had exophoria, average of $4.22^{\Delta}$.
   2 cases had hyperphoria, average $.75^{\Delta}$.
   14 cases had orthophoria.
6. At 6 m. Convergence (Prisms in racks low to high) averaged $19.10^{\Delta}$. Limits ($9^{\Delta}$-$45^{\Delta}$).
   Divergence (Prisms in racks low to high) averaged $7.23^{\Delta}$. Limits ($5^{\Delta}$-$15^{\Delta}$).
7. At 25 cm. Convergence (Prisms in racks) averaged $41.06^{\Delta}$. Limits ($15^{\Delta}$-$70^{\Delta}$).
   Divergence (Prisms in racks low to high) averaged $19.0^{\Delta}$. Limits ($14^{\Delta}$-$38^{\Delta}$).
8. Thirty of the 104 patients complained of ocular fatigue. (This may have been accommodative.)

*Further limited by decades as 20 yrs.—60 mm.; 30 yrs.—70 mm.; 40 yrs.—80 mm.; and 100 mm. as the upper limit for any age beyond.

### TREATMENT.

It is not intended to go into a detailed discussion of treatment but to give a few indications for orthoptic measures, and to describe the forms used. An attempt is usually made to determine and eliminate any cause for the muscle imbalance, whether it be a refractive error or some general condition, as intranasal pressure or sinus disease. After this has been done we prescribe exercises for every type of heterophoria, even hyperphoria, altho prisms are frequently prescribed base up or down, the amount of correction being determined by trial rather than by any fixed rule that 1/2 or 3/4 of the deviation shall be thus corrected. We frequently prescribe full correction for our patients unless we find marked over correction in one field.

The best results have been obtained with converging exercises in patients with convergence insufficiency. One reason for the good results may be the fact that the patient carries the exercises to $75^{\Delta}$ base out at home, both for 6 meters and for 25 cm. and to $90^{\Delta}$ or more for 6 meters and 25 cm. in the office. It has been found that too much exercise may be done so that esophoria develops. And, altho this form of convergence excess has not produced symptoms in the 37 patients in which this has been noted, we now prescribe diverging and converging exercises in association, after the patient has a converging power of $60^{\Delta}$ for distance and near.

We have found converging exercises so valuable in our patients with divergence excess, even tho some have had exotropia at 6 meters, that the necessity for operation has been greatly decreased in the last five years.

In patients with convergence excess and divergence insufficiency, diverging exercises, which, unfortunately, we have only used consistently for two years, have been helpful in some instances where the patient's cooperation could be gained. Diverging exercises have been found of greater

value in convergence excess cases, than the addition of plus spheres which we have found frequently caused discomfort. Supraverging exercises are used when vertical deviations are found, particularly of low degree, but it is usually necessary to prescribe either prisms base up or down for constant use, or to operate.

Exercises for accommodation have also been used, but their value in the treatment of insufficient accommodation has not yet been determined.

The following form, which is made into pads, is used for giving diverging, converging and supraverging exercises with prisms. Also converging exercises with pin and accommodation exercises with print.

## DIRECTIONS FOR PRISM EXERCISES

### (1) Prism Exercises for 20 Feet

Procure a set of square prisms, numbers .....and a square piece of red glass the size of a prism from your optician.

Place a small light (candle or flashlight) on a level with the eyes 10 or preferably 20 feet away. Start with prism number one. Hold it before one eye with the thick end or base.....(in, means toward the nose; out, toward the temple), and the red glass before the other eye. Close the eyes, then OPEN BOTH EYES, and if two images are seen (one red and one white) try to make them appear as one or come together.

When you have done this try a stronger prism. Increase the strength by proceeding to the next higher number, or by adding the prisms with the bases together, or by placing additional prisms base.....over the other eye. When the strongest prism or combination which permits bringing the lights together has been reached, repeat the exercise .....times. Using this prism or combination, switch the prisms and red glass to the opposite eyes and repeat.....times.

Exercises should be done.....times a day using at each exercise the strongest prism you can overcome. If you wear glasses for distance these should be kept on while doing the exercises.

### (2) Prism Exercises for 10 Inches

Repeat exercise (1) with candle or black dot ½-inch in diameter, 10 inches from the eyes 20 times at each exercise. Use reading glasses if prescribed.

Table No. 2.—Record Form for Prism Exercises with Record of a Patient with Convergence Insufficiency Who Complained of Asthenopia.

RECORD OF PRISM EXERCISES.

| Date | Base In | | Base Out | | Remarks |
|---|---|---|---|---|---|
| | 20 Ft. | 10 In. | 20 Ft. | 10 In. | |
| 1/20/25 A. M. | | | 5 | 15 | Nauseated af. exer. |
| 1/20/25 P. M. | | | | | |
| 1/25/25 A. M. | | | 8 | 20 | Eyes felt strained. |
| 1/25/25 P. M. | | | | | |
| 2/1/26 A. M. | | | 20 | 45 | Still feel strained. |
| 2/1/26 P. M. | | | | | |
| 2/10/26 | | | 38 | 60 | Can read with greater comfort. |
| 2/15/26 | | | 65 | 80 | No strain af. exer. Read with comfort. |
| 2/20/26 | 5 | 15 | 70 | 80 | |
| 2/28/26 | 8 | 18 | 90 | 90 | |
| 3/1/26 | 9 | 22 | 90 | 90 | Can read several hours without strain. Patient to continue diverging and converging prism exercises twice a wk. for sev. mos. |

(3) Converging Exercise

Bring a white headed pin slowly to the eyes until doubling occurs, then move the pin away and repeat the exercise. Do this 15 times a day.

(4) Exercise for Accommodation

Hold the smallest print you can read 14 inches from your eyes. Carry the print up to the right eye and left eye, separately, and then both eyes until it blurs. Repeat each procedure .....times at each exercise period. Exercise.....times a day.

N. B.—Do not continue exercises if overtired, and stop exercise if eyes pain or feel strained. Apply hot water to the eyes followed by cold after exercising.

We find that having the patients keep a record of their progress helps to stimulate interest, and we show the form and a typical record of a patient with convergence insufficiency.

In patients who have marked divergence excess with exotropia for distance, the following form is used to give converging exercises. This accustoms the patient to the exercises so that postoperative muscle and fusion training may be started much earlier and are greatly facilitated. It not infrequently happens that surgical treatment is made unnecessary even in cases of exotropia.

## CONVERGING EXERCISES WITH LIGHT AND RED GLASS

Procure a set of square prisms, numbers 1, 2, 3, 4, 5, 10 and three 20$^{\Delta}$ prisms with a red glass of the same size from your optician. Place a small flashlight behind a ⅛-inch opening in a piece of cardboard, or use a lighted candle. Hold the red glass over one eye and observe the light on a level with your eyes. Walk toward or away from the light until the red light seen with one eye, and the white light seen with the other can be brought together to form one reddish white light. As soon as this can be done, walk towards the light until it is impossible to keep the lights from separating. Now go back and come forward again, trying to get nearer the light before doubling occurs. Repeat this approach .....times a day.

If at a distance the lights cannot be brought together then place the weakest prism with its thick end (base) toward the nose. If this does not bring the lights together use the next stronger prism, increasing the strength until that one is found which does permit them to be brought together. Now walk up to the light until two lights are seen again. Walk back and then forward, repeating this procedure.....times at each exercise, decreasing the strength of the prism as rapidly as possible.

As soon as the lights can be held together without using any prism, then try turning prism around and, starting with 1$^{\Delta}$ prism *Base Out* (thick end toward the temple) increase the strength of the prism in this position as rapidly as possible. This exercise may be repeated 10 to 100 times, according to the degree of strain or fatigue produced.

In patients with esotropia or marked convergence excess the following form is used. The exercise, while much more difficult than converging exercises, helps the patient to develop or maintain fusion and increase its amplitude and makes easy early postoperative training.

## DIVERGING EXERCISES BY RECESSION FOR ESOPHORIA OR ESOTROPIA

Procure a set of square prisms, numbers 1, 2, 3, 4, 5, and 10$^{\Delta}$ and a red glass the same size as prisms from your optician.

Place a lighted candle, or preferably a small flashlight, or a ½-inch opening on a black card before an electric light bulb on a level with the eye. If distance lenses have been prescribed, wear them.

Approach the light holding the red glass before one eye, preferably before the one with poor vision or the one which is used less. Two lights, one red and one white, are usually seen, the red one on the same side as the red glass..... Walk backwards or forwards until the lights are as close together as possible. If one light is above the other, tilt the head slightly to the right or left shoulder and endeavor to make the red and white lights come together into one reddish white light.

When the lights do come together, walk slowly away from the light trying to hold the lights together as one reddish white light as long as possible. When the lights separate repeat the procedure and continue the exercise until the lights have been brought together and have separated — times. When this exercise has become easy and you are able to walk back 25 feet from the light, holding the red and white images together place the No. 1 $\Delta$ square prism with its thick end (base) toward the nose. If the lights can be brought together with this prism, proceed to the next stronger and increase the strength of the prism held before the eye until you have reached the strongest one you can use and still hold the two lights together. Then repeat the exercise — times — times a day, increasing the strength of the prism whenever possible.

The patients with esophoria and esotropia also use the following abducting exercises as adjuncts to or, in cases wherein fusion proves impossible, substitutes for the prism and recession forms.

## ABDUCTING EXERCISES FOR ESOPHORIA AND ESOTROPIA

1. Hold the head still, cover the left eye and with the right eye look fixedly at a small

light or white headed pin while moving the pin to the right as far as the eye can follow it. Repeat the exercise — times — times a day. Duplicate the procedure covering the right eye and moving the pin or light to the left.

2. Mark several small cards with one, two or three stars, dots, dashes, crosses or other symbols. Mix the cards, pick one up, and without looking at it hold it on the level with the eyes about 14 inches to the side of the — ear. Holding the face straight forward turn the — eye outward and try to recognize the symbols as they are gradually carried forward.

Repeat the exercise with another card until at least ten cards have been used, trying always to recognize the symbols farther back.

Repeat the exercises with the other eye. Do this — times — times a day.

## Conclusions.

1. Routine examination of the ocular muscles is feasible in clinic practice if there is the proper number of medical and lay assistants.

2. In clinical examinations the screen and parallax test for 6 M. and for 25 cm. and the determination of the near points of convergence and accommodation will detect muscle imbalance. These tests may be done rapidly, and are sufficient for practical purposes.

3. A form for recording examinations has some disadvantages but the advantages, namely, aid to memory, uniformity in recording results, and a fixed position for certain findings, outweigh the disadvantages.

4. In office practice it is important to make a routine muscle examination before using a cycloplegic or prescribing lenses. In some instances proper diagnosis and treatment of muscle imbalance will render the use of lenses unnecessary; again, if lenses are required the patient may not feel as constant a need for them; further, when lenses must be worn constantly, exercises will frequently add greatly to the ocular comfort of the patient, and may prevent the rapid onset of fatigue. After lenses are prescribed they should be carefully checked as to centering and grinding, by the ophthalmologist, and the muscle balance and near points of accommodation should be restudied and recorded.

5. Methods for testing ocular fatigue are of value, and should be used routinely in the study of patients complaining of asthenopic symptoms. An ophthalmic ergograph is valuable but not indispensable in making a diagnosis of ocular fatigue.

6. Muscle exercises have been found of value in disorders of convergence, divergence and supravergence. After a cycloplegic determination of the refraction has been made, and any demonstrable etiology eliminated, they are always prescribed before prisms are worn for constant use, except in disorders of supravergence.

7. Converging exercises may be carried to excess, and convergence excess may be produced with resulting esophoria, which altho in our patients it has produced no symptoms, should be guarded against by prescribing diverging exercises as well as converging exercises, as soon as they are required.

8. Exercises for accommodation have been used in patients with insufficient accommodation but their value is still undetermined.

30 *East 40th Street.*

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# EXPERIENCES IN EXTRACTION OF MAGNETIC FOREIGN BODIES.

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Personal experiences of extraction of steel from behind the iris are here reported. In 61 cases 11 eyes were enucleated. Certain features of these cases are brought out. Siderosis was present in eight cases after periods of one month to four years. Extraction thru the sclera and by the anterior route are compared. In the anterior extraction adrenalin mydriasis proved of special value. Read before the Pacific Coast Oto-Ophthalmological Society, June 7, 1927.

We limit the scope of this paper to the consideration of those pieces of steel extracted from behind the plane of the iris, since 1920. We have analyzed sixty-one such cases.

Statistics are notoriously misleading, and in the case of intraocular foreign bodies are well nigh useless, because the course of events and ultimate outcome in each case depends so much upon various factors and different combinations, such as initial infection, site of perforation, size and shape of the foreign body, etc., etc. One can, however, profit much by reviewing one's personal experiences, and comparing and correlating them with those of one's colleagues. Indeed one does arrive at certain conclusions, and it is surprising how one's views are clarified when studying such an analysis as this and passing the cases in review.

Our cases were all done under local anesthesia, with a Haab giant magnet and Hirschberg hand magnet. We operate with the patient sitting in front of the magnet, for the anterior route, and we value the possibility of immediate retraction of the subject's head when the iris begins to bulge or pain is felt. The eye is illuminated by a Hess hammer lamp. The operator faces the eye in such a way as to get the best possible view. Further steps of the operation are done with the patient on the operating table, either with the hand magnet or with the giant magnet. The series was done under the same conditions, magnets, and by the same operators.

ENUCLEATIONS. In sixty-one cases, there were eleven enucleations, or eighteen per cent. Of these, two were primary, because of panophthalmitis with very large foreign bodies. In two cases, the foreign body was impaled in the sclera and could be removed with difficulty, only after enucleation. In two cases, the wound of entry was scleral, near the ciliary body, and had therefore led to progressive hypotony. In two further cases, there was marked initial infection with exudate into the anterior chamber and extensive hemorrhage in the vitreous, which also led to the soft eyeball which it was not safe to retain. In one case, vitreous abscess was present, and continued to develop after the extraction. Another had massive vitreous hemorrhages and a +++ Wassermann, with protracted inflammation which necessitated enucleation to safeguard the other eye. Finally, one case with massive vitreous hemorrhage and increasing inflammation during eight days; three X-rays localized the F. B. on the retina, or within the sclera at the posterior pole. Posterior extraction was attempted with insertion of hand magnet. There was ultimate shrinking of the eye. Enucleation showed this to be a double perforation and that operative interference should have been omitted. This type of case, of which we had several, was a difficult problem. We have found it advisable to err on the side of conservatism as we found "watchful waiting" might be rewarded by the detection of double perforation as the vitreous cleared and the inflammation subsided, as is usually the case even if the F. B. should prove to be intraocular. The risk of letting an intraocular F. B. rest for a few weeks would seem to us the lesser of two evils. We are confirmed in this view by the review of our extractions of foreign bodies of several weeks to months standing, even in the presence of in-

itial infection. In this connection, one may recall Haab's series of fourteen cases of intraocular foreign bodies of several years' standing, without siderosis or reduction of vision. In summarizing, one may observe that the enucleations were, with one exception, unavoidable and due to the nature or extent of the primary insult.

SIDEROSIS was present in eight cases, or thirteen per cent. In seven cases, extraction was successful, and such vision as was present was retained or subsequently improved by extraction of cataract. In one case, the F. B. could not be extracted. Of special interest were: One case of but one month's standing with siderotic amaurosis, size of foreign body three by one by one mm., and another of six months' standing, F. B. on ciliary body, and vision of 0.8. In the latter case, 0.8 vision was retained, following extraction by the posterior route. After one year, there was gradual development of cataract which was extracted. In spite of black pupil and clear media, there was vision of but light perception. Siderotic degeneration of the retina therefore had progressed after the extraction of the offending F. B. itself.

The time elapsed since the entry of the various F. B.'s varied from one month to four years. In most of these siderotic eyeballs, convalescence was smooth, nor was there delayed healing. The same applies to subsequent cataract extractions, in which it was incidentally noted that the capsule was considerably thickened. Finally one case was seen after complete absorption of the F. B., with siderosis occurring and recent development of glaucoma. Of eight siderotic eyes, five were practically blind, due to siderosis. If one considers that the extraction offered no difficulties, it is apparent how easily this loss might have been avoided, for the injured as well as for the insurance carrier, if the operation had been performed at an earlier date.

ROUTES. Of the successful extractions, twenty-four were done by the anterior route and twenty-five by the posterior. In the series of posterior extractions, there were four enucleations which have already been detailed and seven cases of retinal detachment, two or which became reattached with good vision. In fifteen cases vision was the same as—or better than—before extraction. In five other cases with almost no vision, the site of perforation was scleral and the F. B. large. Of the anterior cases, twenty-one extractions were successful inasmuch as the vision remained the same, or was improved by extraction. Two cases came to enucleation, noted above. The lens was not injured during the course of extraction in a single case. Nine iridectomies, however, were performed.

A comparison between the results of the anterior and the posterior routes is obviously not a fair one, for the cases are selected for the operations, —the good ones for the anterior, the bad ones for the posterior route. At other times, when the anterior route has failed in its purpose, the onus must be borne by the posterior route. The posterior route indeed often plays the role of the stepchild; it is given the large and jagged pieces, those tied down by scar tissues, or those which have torn thru the ciliary body on their entrance. The posterior route may therefore be pardoned a host of sins, but not that of retinal detachment, which, in our series, totalled seven, five of which were definitely postoperative. That two of these became reattached with good vision may be regarded as undeserved, and the exceptions which prove the rule.

The detachments occurred some three or four months after operation and it is important to note that, in these very cases, the operative notes, dictated on the day of operation specified on each occasion—"Exceptionally smooth, no traumatism or vitreous loss." Haab, in reviewing the literature of posterior extractions, calls attention to such operative notes as the above, and indicates that they have no bearing on the case. Here we entirely agree with him. Altho the posterior route commands the field in certain cases, we feel that its comparative ease

of performance should not broaden its scope, but that the anterior route should be used whenever it is at all possible. The difficulties of the successful execution of the latter are considerably greater; but, in our experience at least, the assurance of a good end result with preservation of vision has been much greater. We regard the exact localization with the Sweet localizer, by an expert in this particular field, and a thoughtful consideration of the size and the location of the F. B., as well as intimate contact and consequent cooperation of the patient previous to the operation, as part and parcel of the operative procedure itself.

The bugbear of the anterior route appears to be the danger of the F. B. becoming stuck in the iris on its way to the pupil, and consequent necessity of an iridectomy. It is true that in our series two of the iridectomies were premeditated, as the patient had undergone several attempts at extraction elsewhere with resultant impalement of the F. B. in the ciliary body. In such cases an iridectomy, followed by insertion of the tip of the hand magnet into the posterior chamber, resulted in smooth extraction. Yet the percentage of iridectomies is higher than one would wish.

In a painful, irritated eye, it is not always possible to achieve maximum mydriasis. Haab has suggested the injection of 10% cocain with a drop of adrenalin to obtain anesthesia, in those cases where the F. B. presented behind the iris. He states in this connection that the local dilatation of the pupil, due to cocain, may incidentally facilitate extraction of the F. B. thru the pupil. It occurred to us that a subconjunctival injection of adrenalin near the limbus might solve a number of difficulties and obviate what we regard as the main hazard of the anterior route.

Adrenalin Mydriasis. We have found that the use of subconjunctival adrenalin injections to dilate the pupil, break down synechiae and in glaucoma secondary to iritis gives better results than the injection of atropin, and that the latter can be dispensed with. One gained the impression that the stimulation of the dilator, apart from all other considerations, is much more important and useful than the paralysis of the sphincter with atropin. It occurred to us that in certain intraocular operations a mydriasis due to tonicity of the iris, would be preferable to a mydriasis due to paralysis of the iris. One might say that in a "tonic mydriasis," there should be less tendency to prolapse of the iris upon opening the anterior chamber, than in a "paralytic mydriasis." Certainly the anesthesia should be improved and, if the hypotension did not interfere with the ease of operative manipulation, it, in itself, should tend to prevent prolapse of any of the contents of the eyeball. This indeed proved to be the case.

In seven cases of intraocular steel extraction by the anterior route, we injected five minims of adrenalin subconjunctivally near the limbus, with the third drop of cocain. Within ten to fifteen minutes, the pupil had maximally dilated, anemia was marked, with consequent absence of hemorrhage and excellent anesthesia. The hypotony did not disturb in the least. The guidance of the F. B. into the A. C. was much facilitated and we received the impression that the tonus of the dilator actively retracted the iris from the F. B. as the latter approached and passed the pupillary margin. Interestingly enough, the pupil contracted somewhat after the passage of the F. B. into the A. C., no doubt due to the mechanical irritation during its passage. This was not unwelcome. The extraction of the F. B. from the A. C. with a hand magnet seemed easier than with the atropinized pupil. There seemed less tendency of the iris to follow the F. B., or to prolapse, and there was no need of reposition. We found no record in the literature of subconjunctival adrenalin as a preoperative measure in magnet extractions, and we hope that this suggestion may be tested. Age and vascular disease will set limitations upon its employment but, in selected cases, it would seem to be a measure of promise.

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# NOTES, CASES, INSTRUMENTS

## NOCTURNAL LACHRYMATION IN GRAVES' DISEASE.

H. GIFFORD, M.D., L.L.D.

OMAHA, NEBR.

In this journal (May, 1927, p. 337) Dr. Lancaster reported a case in which watering of the left eye only, while lying in bed at night, was about the only symptom remaining of an attack of Graves' Disease beginning several years before. This was of especial interest to me as an independent corroboration of an observation of a similar symptom made by Dr. George Strader of Cheyenne, in The Ophthalmic Record for 1906, p. 493. In describing the case which he reported as an example of the lid symptoms to which I had previously called attention, he said: "Eyes watery, worse at night." When thru his courtesy, I saw the case a few weeks later I noted in an addendum to his article, "Another interesting feature of her case was the fact that the excessive lacrimation was confined to the right eye and troubled her only at night when lying in bed. This disposes of the theory that this lacrimation is due to exposure of the globe, either from the protrusion or from the infrequent winking." I have cherished the belief that this was the first report of this syndrome, but on consulting Sattler's monumental work (Graefe-Saemisch Hand-book, second edition, Vol. IX, Kap. XIV, pp. 121 and 119), I learn that excessive lacrimation, confined to one side and occurring only at night, in bed, was described as a symptom of Graves' by Wilbrand & Saenger (Neurologie des Auges, 1901, II, p. 137), while in Berger's case (Arch. f. Aug., XLVI, 1902, p. 118) with tearing from one or both sides, nightly attacks of lacrimation accompanied by palpitation of the heart and strong pulsation of the carotids were a marked feature. From Berger's account it is not certain whether tearing also occurred by day, tho the inference is that it did.

To these I can add another case of my own: A man of forty-seven, about a month before appearing, noticed that his eyes were swollen and had a "starey" appearance. I found him to have all the classical symptoms of Graves' Disease. He said that the eyes had been watering a great deal at night when in bed; this in spite of the fact that when examined in the day time the eyes appeared rather dryer than normal, and that the extra vigorous manipulations necessary to turn the lids produced no secretion of tears.

Until the nocturnal cases were reported, the most obvious explanation of excessive tearing in Graves' was that adopted by Stellwag and others, that it was due to the undue exposure of the eyeball and the infrequent winking. Schmidt-Rimpler (Wilbrand & Saenger loc. cit. p. 22) in addition, laid stress on an alleged eversion of the tear-points. This easy explanation is plainly insufficient after the reports cited by Sattler of Berger, Verreau, Mathieu and myself, in which excessive lacrimation was either noted long before the exophthalmos appeared, or persisted long after it had disappeared. Still more difficult to explain on the exposure theory were the cases above mentioned of lacrimation at night only, and sometimes only from one side.

Lancaster states definitely that in his case, the lids closed perfectly and easily but he still believed that the nocturnal tearing could best be explained on the exposure theory, because he was able to stop it by bandaging the eye very carefully at night. It seems to me quite possible that such a tight bandage as he describes might easily have kept the tears within the natural channels. Moreover as the tearing did not return when the bandage was left off and it seems hardly probable that the bandage had a curative effect, it is more likely that the final cessation was a coincidence rather than an effect from the bandaging. Lancaster himself admits that on account of the wider fissure on the other side and the fact that it was the only eye which had shown the exophthal-

mos, the other side was the one where the watering would have been expected. In none of these nocturnal cases has there been any evidence recorded of imperfect closure of the lids during sleep.

Regarding the eversion of the tear-points, which Schmidt-Rimpler believes to play a part in the watering, Berger states that in his case there was no abnormality of the tear passages; and in my last case above reported, it was specifically noted that the tear-points were in good position and the passages patent. Moreover, I have never seen any tendency in any case of Graves' for the tear-points to be turned out, no matter how great the exophthalmos might be.

All things considered, it seems probable that the contention of Wilbrand and Saenger, of Berger and of Sattler, that such lacrimation is due to undue stimulation of the tear gland is correct; but whether this occurs, as Berger supposed, thru the sympathetic, or as Wilbrand and Saenger suggest, thru a combination of trigeminus, facial and sympathetic fibers, seems still to be an open question.

It might be suggested that hyperthyroidism may in some cases produce a hormone which stimulates the tear gland. The cases of one-sided tearing are opposed to this theory, and it should be noted that in Lancaster's case and in my most recent one, the metabolic index was normal, and that Lancaster's patient was even thought to need thyroid feeding. In this connection, too, one should remember a case reported by Wilbrand and Saenger (loc. cit. p. 23) in which the patient developed marked symptoms of myxedema with annoying lacrimation of both eyes. This, together with the myxedema, disappeared on the use of thyroid tablets.

To be sure, a one-sided lacrimation in Graves' is no harder to explain than a one-sided exophthalmos, and no easier. All that can be said is that when we have a two-sided exophthalmos with a one-sided watering, they can hardly be due to the same hormone altho I suppose it is possible that a blood-borne hormone might produce a one-sided stimulation, because of a upper one they might be taken up by winking.

As to the nocturnality of the excessive lacrimation in some cases of Graves', it is difficult to believe that this depends upon increased excitability alone, but if we may assume such an excitability, of so low a degree that its results are not evident during the day (on account of winking and exposure to evaporation), it is not difficult to believe that, during the night, when the eyeball is covered and the pumping action of the lids is shut off, the tears in such a case, may accumulate so as to run out on the cheeks.

This does not exclude the possibility that nocturnal lacrimation may, in part at least, be due to the position of the head. With the above assumed slight increase in excitability, lying flat on the back would tend to cause the greater part of the tears to flow toward the outer corners of the sac and thence to the cheek. Lying on the side would of course favor escape of tears from the lower eye, while in the upper ones they might be taken up by the tear-points even in the absence of winking. It would be interesting to know whether in the one-sided nocturnal cases, the patients habitually slept on one or the other side. If this were not the case, one would have to assume a one-sided excitability of the tear gland.

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## "EXPLOSION" OF ARTIFICIAL EYE IN THE ORBIT.

WM. W. LEWIS, M.D.,

ST. PAUL, MINN.

Whether the "explosion" was due to positive or negative air pressure within the glass eye, or from pressure of the surrounding orbital tissues upon it, can not be determined. But removal of the eye from the orbit, afterward, was accomplished with difficulty, on account of suction within, which held a tuft of the conjunctival tissue fast in the aperture in the glass, and

necessitated considerable force to pull it loose.

The patient is a mechanic of superior intelligence and his description of the occurrence most interesting. Sitting in the power station, while on duty, he was reading when an explosive like shock took place in his orbit. Fellow workers, who were looking directly at him at the moment, state that his head jerked violently backward.

He immediately felt pain in the orbit and upon attempting to remove the artificial eye, which he could, ordinarily, do with ease, he found that something held it fast (suction), and it had to be wedged out with considerable force. The conjunctiva over the stump was found to be bleeding and slightly lacerated. Close examination of the glass eye showed an aperture in its posterior, concave surface, about 5 mm. in diameter. The broken glass pieces were contained within the eye and slightly blood stained.

The glass eye was entirely smooth, showed no erosion, as is commonly found after long use, nor was it perceptibly different from the usual prothesis. The patient had worn a glass eye for many years and this particular one about 6 or 7 months. It was an exceptional experience to both patient and surgeon.

*Lowry Building.*

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## SPONTANEOUS HEMORRHAGE, OCCURRING LATE AFTER CATARACT OPERATION.

L. Webster Fox, M.D., LL.D.,

PHILADELPHIA, U. S. A.

The case which constitutes the basis of this special report is mentioned in the pamphlet covering the Clinics for 1926-1927, of my service in the Post Graduate Course at the University of Pennsylvania, and is given here to be more ready of access, for those doing special investigation along this line.

The patient was a young girl whom we shall identify as M. R., and she was the subject of congenital cataract in both eyes. Ophthalmic surgeons in two different cities had operated upon her, on both eyes, doubtless performing the discission operation in both instances. The left eye had been operated upon in June, 1926, and the pupillary area was filled with an organized secondary structure which obstructed vision. Ten months afterwards a spontaneous hemorrhage appeared in this pupillary area overlying the secondary cataract, or capsular remains.

When seen on May 11, 1927, the hemorrhage was still present and had the appearance of fresh blood. It is just possible that this bleeding was much less than it appeared, and that the bright red color was due to dilution. The patient was kept under observation, meanwhile utilizing all the various methods for the control of internal hemorrhage, until May 25, 1927, at which time the color of the extravasated blood was unchanged. It was assumed, however, that there had been no further bleeding, since the quantity was unchanged in amount. It was not deemed advisable to inflict any further traumatism upon this eye by any surgical procedure directed towards the cataract, since in all likelihood this would precipitate a definite hemorrhage in this eye.

The other eye, the right eye, had already been the subject of two operations and much the same condition obtained in this eye altho there was no hemorrhage. The age and sex of the patient as well as the deplorable condition in which she was, prompted us to perform an iridotomy upon this eye. The eye was prepared and anesthetized by cocain instillations and the eye speculum introduced. The English broad needle was then plunged into the cornea, and thru the secondary cataractous structure to the nasal side of the pupil. Upon removal of the instrument, the De Wecker scissors were passed thru this opening, closed and made to open within the anterior chamber, in order that one blade might be beneath and the other above the secondary cataract.

This was attended with great difficulty, and even when accomplished, the cutting of the membrane was not

followed with the retraction of the cut ends as is usual in these cases. Several attempts at cutting this followed. The Tyrrell's hook was used, alternately with the scissors, several times, before an opening was made in the membrane, which would not close upon withdrawal of the instruments. Considerable bleeding followed this manipulation, but not of the character noted in the other eye, and it promptly subsided before the eye was finally dressed. It did not recur. The site of the puncture was touched with a one per cent trichloracetic acid solution on a cotton swab, noviform-atropin ointment was applied, and the occlusive dressing placed over the eye.

This condition of spontaneous hemorrhage after such an operation must be infrequent. In our experience we can recall but one other case, in which it persisted for a period of one month.

303 *South 17th St.*

# SOCIETY PROCEEDINGS

## ROYAL SOCIETY OF MEDICINE.

### Section of Ophthalmology.

OCTOBER 14, 1927.

MR. ERNEST CLARKE, M.V.O., F.R.C.S., President.

### Process of Retinal Differentiation in Man.

MISS IDA C. MANN, who has recently been elected to the staff of the famous Moorfields Ophthalmic Hospital, read a contribution on this subject, and demonstrated a large number of slides by means of the epidiascope in illustration of the theme. She first reminded members that three months previously, in Edinburgh, she read a paper dealing with the broad principles of differentiation of the retina in the lower vertebrates. Her purpose on the present occasion was to show the application of these principles in detail to the human retina.

The chief points were the following: (1) the appearance of the conducting layers before the percipient ones, i.e., the fibers of Müller, the ganglion cells, and the nerve fiber layers differentiated before the rods and cones; (2) the derivation of the amacrine cells from the same layer as the ganglion cells, and their secondary fusion with the bipolar layer.

The specimens with which she illustrated the paper consisted of retina from the posterior pole, normally just above the macula. She was not proposing now to deal with the modification of the general development which took place in specialized regions, such as the macula or the ora serrata.

She said that the layers of the adult retina, from the internal limiting membrane to and including the rods and cones, were formed by proliferation and rearrangement of the nuclei of the inner wall of the optic cup. The pigment epithelium was formed from the outer wall of the optic cup.

The change occurring in the inner layer could be roughly divided into three periods, which, in the posterior part of the cup, corresponded, in time, with:

(1) The fourth to the fifth week;
(2) Six weeks to the third month;
(3) The third month to the seventh month.

First period. The inner wall consisted of a nucleated zone of primitive neuro-epithelium, and an inner non-nucleated marginal zone. At the end of this period, the nuclei of the neuro-epithelium began to migrate inwards into the marginal zone, two nuclear layers being formed in this way.

Second period. These two nuclear layers were named the inner and the outer neuroblastic layers, respectively; they were separated by a narrow interval, the transient fiber layer of Chiewitz.

Third period. From the cells of the inner neuroblastic layer were formed, by differentiation, three types of cells; amacrine cells, ganglion cells, and supporting cells (the fibers of Müller). From the outer neuroblastic layer were also formed three types of cells: bi-

polar, horizontal, and rod and cone nuclei. Towards the end of the period the transient fiber layer of Chiewitz disappeared (except at the macula, where development was retarded), and the amacrine cells and Müllerian fiber nuclei fused with the bipolar and horizontal cells to form the inner nuclear layer. The inner and outer molecular layers appeared and separated themselves from the ganglion cells on one hand, and from the nuclei of the rods and cones on the other.

**Pterygium.**

MR. F. JULER showed a little girl, aged 4 years, with pterygium. When he first saw the child, a pterygium had been removed at another place, from both eyes, and she came to him with a recurrence of the condition in the left eye. This recurrence he removed by the ordinary method in July of last year, and the result of the operation seemed to be satisfactory.

However, a relapse occurred later, a grosser condition than the original one. He removed the further recurrence eight months ago, burying the apex under the conjunctiva below. Still a further recurrence took place, and there was now a large pterygium, reaching the pupil margin and interfering with vision. On the other cornea were one or two nebulae, apparently the commercement of a pterygium, and he thought it likely that there was some ulceration to start with. On the other hand, the mother said that something amiss with the child's eye was noticed soon after birth. His feeling was that he ought to see what radium would do for the condition.

*Discussion.* COLONEL LISTER and MR. HARRISON BUTLER said they had not seen a condition like this in the many cases they saw abroad of pterygium, in respectively, Northern India and Jerusalem.

MR. MACCALLAN said this was the earliest example of the condition he had seen, tho he had had experience of many cases of pterygium in Egypt. He dealt with them in the way Mr. Juler operated on the recurrence in this case. It was most important that conjunctiva should be left adjacent to the cornea. If the bare area was touched with pure carbolic acid two or three times it inhibted the growth in many cases, and prevented recurrence, which was the tendency if this was not done.

**Growth in Vitreous.**

MR. PRESTON showed a case of mass in the vitreous. The patient was under the care of Mr. Greeves. The possibilities of it being glioma, tubercle, Coats' disease, or some inflammatory condition were considered. Mr. Greeves inclined to the view that it was glioma, but there was pigment on the lens.

*Discussion.* MR. J. H. FISHER also thought it was glioma, and advised excision of it. What evidences there were of it being inflammatory were trifling; there was no iritis nor evidence of keratitis punctata, and the tension in that eye was quite equal to that in the other.

MR. HUMPHREY NEAME reminded members of a case of which he showed the drawing, in which there was a very similar appearance, but the vessels could be seen to emanate from the central part of the eye and then to divide peripherally as they passed out over the mass towards the ciliary body, and that supported the diagnosis of glioma.

**Tissue Formation in Cornea.**

MR. FOSTER MOORE sent a case of new tissue formation on the cornea. The girl attended because of a white opaque patch on the limbus of the right eye. In the other eye was an opacity on the limbus above. In this left eye was a yellow translucent area, which had gradually become larger, and was now interfering with vision. This patient had suffered from chronic blepharoconjunctivitis in both eyes.

*Discussion.* SIR WILLIAM LISTER considered that the case belonged to the group of "washleather patch" of the cornea. These cases showed a variable amount of infiltration and vascularization. He had examined a sliced off portion from a case, and it showed a mass of round cells, and a few large ones, like giant cells; but there was nothing very distinctive about the

microscopic picture. The condition cleared up in that patient.

MR. O. G. MORGAN spoke of a similar condition he had seen in an adult; there was the same sharply demarcated edge. The patient became blind, the cornea becoming quite opaque. In the other eye practically half the cornea was covered. Somewhat late, tuberculin was tried, and from that time the inflammatory reaction began to go, and in the three years since it had not increased at all. Vision was now secured thru a ¼ sector of the cornea.

MR. TREACHER COLLINS thought a microscopic examination of a small portion should be made, as he feared epithelioma.

MR. HUDSON said the child was obviously a congenital syphilitic, and conceivably the eye trouble might be related to that disease, perhaps it was an atypical interstitial keratitis. It would be well to give antisyphilitic treatment.

**Retrobulbar Neuritis and Optic Atrophy.**

MR. HUMPHRY NEAME showed a boy, aged 17, in whom retrobulbar neuritis had been followed by optic atrophy. In May last, he came to hospital complaining of failing vision which had lasted ten days. There was neither pain nor discomfort in moving the eyes. Vision was 6/60 in each eye. There were 2 D. of hypermetropia, and vision was not improved by spheres. There was loss of color perception in the center and upper portions of each field. Sepsis of tonsils was found, and a few weeks after that had been dealt with he was reported to be better. The sinuses and the sella turcica were pronounced normal on roentgen ray examination.

*Discussion.* MR. MALCOM HEPBURN thought it possible that this condition was the beginning of disseminated sclerosis.

MR. GRAY CLEGG said that a few days ago he had a case of a similar type. There was some inflammation of the optic nerve head and retina some months ago. That had now subsided, and the man now had a large central scotoma.

MR. MORGAN thought the likelihood of Leber's optic atrophy should be considered, tho he could not get a history of a similar condition in other members of the family.

MR. J. H. FISHER said that despite the roentgen ray findings concerning the sella turcica, the possibility of this being hypopituitarism could not be ruled out. This patient had the characteristic waxy skin, and had no growth of hair on the face; in addition the shape of his skull was uncommon. There might have been some pressure from above on the diaphragma cellae, producing evidence of hypopituitarism and secondary optic visual pathway involvement by that means.

**Subconjunctival Cyst.**

MR. HUDSON showed a subconjunctival cyst in a boy, aged 4. He regarded it as a scleral cyst, as sclerotic tissue could be seen stretched over the outer part of the cystic swelling. There was no history of injury, such as would lead one to suspect implantation cyst or partial rupture. He would explore it and examine the lining wall. A member suggested he should inject tincture of iodin but the speaker considered that would be risky. It had become smaller during the past fortnight, and it was possible it might get smaller still.

**Tumor of Orbit.**

MISS ROSA FORD showed a case of orbital tumor which was secondary to a breast tumor which was removed. She asked what was likely to be the effect of radium in such a case.

MR. GRAY CLEGG thought the insertion of a tube of radium would prove of considerable service.

**Congenital Coloboma of Macula.**

MR. R. C. DAVENPORT showed and demonstrated on the screen two cases of socalled congenital macula coloboma in both eyes in a mother and son. It was, he said, striking to find the condition in two members of a family. The mother illustrated the flat type of

lesion, the son the excavated type. In regard to the etiology, it was more difficult to explain it in four eyes on an inflammatory basis than on a developmental one. Both these patients had vision 6/24 binocularly. The mother said that in both her own and her son's cases the condition was noted from birth.

MR. M. HEPBURN objected to the application to these two cases of the term coloboma. "Coloboma," he contended, meant coloboma of the choroid, and if any other situation than the macula was concerned, one saw a gap in the choroid when looking at the sclera. Here there was but little of that proliferation of pigment which characterized true coloboma. He regarded the condition as a definite inflammatory scar, even tho it happened to occur in both mother and son.

THE PRESIDENT said it would be wise to use the word in inverted commas in such cases. The Germans implied that coloboma meant congenital absence of choroid.

MISS IDA MANN said that in the boy, tho there was excavation and some failure, one could see many large choroidal vessels all over the floor, and there was no actual absence of choroid. She considered that the tissue seen was scar tissue overlying the choroid.

MR. TREACHER COLLINS supported the idea of the congenital origin of these gaps in the choroid, and told of a case, with the same defect of vision as this boy, who yet was doing quite well at a public school.

THE PRESIDENT mentioned a case of the kind. He, despite restricted vision, took an agricultural degree. He seemed to have trained the periphery of the retina to carry out the function normally appertaining to the center.

The meeting concluded with an epidiascopic demonstration of drawings illustrating various congenital abnormalities of the optic disc.

H. DICKINSON,
Reporter.

## CHICAGO OPHTHALMOLOGICAL SOCIETY.

May 23, 1927.

ROBERT H. BUCK, President.

### Membrane in Vitreous, Iridoplegia and Depigmentation of Iris Following Trauma.

DR. W. A. MANN presented a case of blunt injury to eye followed by membrane in vitreous, iridoplegia, and depigmentation of iris in a boy of 7 years of age, who was seen six days after having been struck in the right eye by a metal rod thrown from a distance of twenty feet. There had been pain, insomnia, redness, photophobia and lacrimation and swelling of the lids. There was no light perception in the injured eye; vision in the left eye was 1.0 (illiterate test). Right tactile tension was +2; the palpebral fissure was closed by blepharospasm, swelling and edema of the lids; there was a complete mixed injection and moderate chemosis of the bulbar conjunctiva. No cicatrix or penetrating wound of the cornea or sclera was present; the lower third of the cornea was faintly stippled. A complete hyphema was present except for an irregular 3x4 mm. area near the center of the inferior temporal quadrant, where the dark color of the iris was seen. No pupil or iris details were seen because of the hyphema. There was no consensual pupil reaction. Radiograph was negative for foreign body. Iris of the left eye was brown; pupil, disc and tactile tension were normal.

Treatment consisted of instillations of atropin for thirty-four days, with cold and hot fomentations. Seventeen days after the injury, the aqueous was for the first time perfectly clear, anterior chamber of normal depth and lens practically clear. Pupil was 8x9 mm. and rigid. A dense, dull, greenish-gray mass without vessels was seen in the vitreous just behind the lens. Gradual absorption of this mass took place until forty-two days after the injury, when there was noted a central gray ring just posterior to the lens capsule, adherent thereto, situated

at the apex of a conical or tent like opaque surface. This gradually absorbed, and at the present time apears as a fixed fibrinous opacity on the posterior lens surface. Vision gradually improved, and patient could now recognize shadows. The pupil remained widely dilated and the iris depigmented; color previous to injury was brown, but depigmentation had been progressive. The presentation of the case was suggested by the fact of the iridoplegia, depigmentation of the iris and lack of involvement of the lens except for the opaque structure at the posterior pole.

**Splinters of Wood in the Orbit.**

DR. T. D. ALLEN presented a patient who was injured about a year previously in an automobile accident. Three days after the accident, when first seen, it was impossible to open the eye on account of swelling. There was discharge from a wound in the supraorbital region and another in the upper eyelid. After the wound was cleansed, a number of small pieces of wood were removed from the orbit; occasional probing resulted in removal of several other splinters. After about three weeks it was allowed to heal without any unfavorable after effects. There never was any involvement of the optic nervehead, and no interference with vision at present. Muscle balance was perfectly normal in all directions. Roentgen rays did not reveal shadows from the splinters at any time, and it was thought by those who saw the case at first that there was no foreign body in the orbit.

*Discussion.* DR. W. A. FISHER asked if blood examinations had been made in either Dr. Mann's or Dr. Allen's cases. There might be a question of leucocytosis, and in Dr. Mann's case there was a possibility of sympathetic inflammation, and a blood serum injection might be strongly indicated. If there were leucocytosis, a blood serum injection should be made, similar to that reported by him recently. All serious injuries to the eyeball would be well treated by adding to the standard treatment the injection of 5 c.c. of blood serum from the patient and 15 c.c. blood every four days, intramuscularly, for four injections, particularly where there was reason to anticipate sympathetic inflammation.

DR. T. D. ALLEN (replying to Dr. Fisher) said, that as in his case there was no penetrating injury of the eye itself, there was no question of sympathetic ophthalmia.

**Retinitis Punctata Albescens.**

DR. ALVA SOWERS read a paper on this subject, to be published in full.

*Discussion.* DR. ROBERT VON DER HEYDT congratulated Dr. Sowers on this presentation and the oportunity of showing these cases, after seventeen years. Lauber's report on this family is a classical one. Presumably, hemeralopia is caused by the mechanical presence of dots in proportion to the involvement. Based on Lauber's report, the classification of two separate entities is justifiable. The stationary type is no doubt a distinct disease in itself, altho it looks like the other. If a group were found in which there was one progressive case and one stationary, some relationship could be claimed, but at present there is nothing to show this. Medication is of no value in the treatment of this disease.

C. LOEB,
Secretary.

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## SAN FRANCISCO COUNTY, MEDICAL SOCIETY.

**Eye, Ear, Nose and Throat Section.**
Sept. 27, 1927.

DR. WARREN D. HORNER, Presiding.

**Toxic Amblyopia.**

DR. WALLACE SMITH in his paper emphasized the importance of cooperation between the ophthalmologist and the rhinologist and with this mutual understanding the posterior accessory sinuses should be opened whether their inspection and roentgen ray findings show any pathologic signs or not. When there is an unilateral enlargement of the blind spot or central scotoma, after cranial diseases, multiple sclerosis and alcoholism have been

eliminated, operation should be performed. The results are uniformly satisfactory, recovery usually taking place in a very few days. The pathology has not been worked out. The impaired function of the optic nerve may be from pressure, infiltration or toxemia. The nose often appears entirely normal. There may be deviation of septum or swelling of the middle turbinate. Rarely do we find polypi, empyema, or marked hyperplasia, but after entering the ethmoid capsule or sphenoid we find mucous, pus and granulations. These cases should be operated on at once before permanent changes of visual field occur.

*Discussion.* Dr. Joseph Crawford said the first observations recorded were made by Fuchs in 1901 and much has been written since that time as to theories of cause, treatment and prognosis, however, very little information as to pathology has been forth coming. Among the most helpful contributions were those of Herschfield and Van Der Hoeve. The occurrence of the symptoms vary with different observers. This may be due to the fact that the picture varies from the smaller degree of blind spot enlargement to orbital abscesses with panophthalmitis and absolute blindness. Elschnig finds, for example, 25% in unilateral cases and 45% in bilateral cases. The American literature contains many reports of such cases. The clinical findings are, subjective impairment of vision of varying degree, usually unilateral. Objectively, very slight changes are seen with the ophthalmoscope, often only temporal pallor of the disc, rarely a complete papillitis where complete recovery does not occur.

The enlargement of the blind spot is the important sign. This is so constant as to be considered pathognomonic. Central scotomata of varying degrees and types may be present but are not constant.

The position of the peripapillary fibers in the optic nerve being on the periphery, they are first brought into contact with the mechanical or chemical destructive agent, hence are first affected. The maculopapillar bundle lies deep in the nerve but is next to the vein of Voissean and is particularly sensitive to any toxin which may circulate in its vicinity.

He concludes:

1. Optic neuritis is a fairly common complication of infection of the posterior nasal sinuses.
2. Its recognition by perimetric examination is easy but rarely undertaken.
3. Perimetric examination is a useful adjunct in diagnosis of obscure sinus conditions.
4. In the presence of positive perimetric findings indicating optic nerve involvement operative interference is always justified.

A recent personal communication from Dr. Peters states that in this type of case the Gullstrand ophthalmoscope usually shows some elevations about the disc which cannot be recognized by the ordinary examination. This observation has not yet been published.

**Retrobulbar Neuritis.**

Dr. Harold Fletcher reported in detail an unusual case of retrobulbar neuritis, seen with Dr. Horner, which was characterized by a rapid onset of loss of vision following an acute respiratory infection. The posterior ethmoid and sphenoid sinuses altho appearing normal to inspection, were opened and a thickened membrane with granulations and a slight amount of free pus was found. Within a very few days the symptoms of peripheral paralysis developed terminating in absolute paralysis below the thorax and a diagnosis of anterior poliomyelitis was made. Despite the onset of the more serious disease, the ocular symptoms cleared rapidly and the course of the disease demonstrated that the optic neuritis was dependent upon the sinus infection. This patient is still under treatment for poliomyelitis and the final outcome cannot be stated.

*Discussion.* Dr. Warren Horner reported the findings in this case from the ophthalmologist's standpoint. The vision went rapidly down to counting fingers at six feet. Following the operation vision was approximately 15-

100. The severity of the infection has left some permanent changes in the disc so that the vision may be defective due to the secondary optic atrophy.

Dr. Gibson mentioned some studies carried on by Drs. White and Verhoeff in Boston in which a series of cases was followed, partly treated by surgery and partly by medical means. There appeared to be no difference in the outcome.

Dr. O'Barrio mentioned the muscle inbalance which often accompanies sinusitis, particularly the failure of convergence which attends sinusitis in many cases.

Dr. Kaspar Pischel stated that the recognition of the intimate relation between diseases of the accessory sinuses and eye affections dates back over 40 years; in the eighties a number of publications on this subject appeared in the German literature, but more work in this line has been done in this country, probably because most of us are accustomed to combine eye and nose work.

The question of pathology in the nose and advisability of an operation is sometimes very difficult to answer. A deviated septum in the upper region with moderately enlarged middle turbinate may leave fair breathing space and may not appear pathologic, but it can easily hide a chronic ethmoiditis; in such cases, I consider an immediate operation a lesser risk than to wait.

Dr. Dohrmann K. Pischel reports: It has frequently been stated by Ziem, Meller, G. Portmann and others that simple passive congestion in and around the optic nerve might be the cause of this retrobulbar affection. Therefore, these operations on the sinuses, even when there are no pathologic processes present, may be of benefit by changing a passive to an active hyperemia or by simply diminnishing the amount of blood in a congestion of the optic nerve.

Dr. Otto Barkan agreed that the more advanced work in this direction has been done in America than in Europe, possibly because of the fact that Americans are better educated to the idea of focal infection and are willing to have operations on parts of the body removed from the site of the disease.

Dr. Heber called attention to the work upon this subject done in America within the last few years as being of a higher type than anything produced in Europe. He emphasized the post nasal appearance in sinusitis in this type when examined with the nasopharyngoscope. The posterior tip of the middle turbinate and the adjacent mucous membrane between this point and the ostium of the sphenoid is usually fiery red and the seat of a streptococcic infection.

Dr. Mehrtens described the progress of the poliomyelitis in the patient referred to by Drs. Fletcher and Horner as seen by a neurologist. He believed that the retrobulbar neuritis was definitely improved by the operative treatment.

R. S. Irvine
Secretary

# INTERNATIONAL OPHTHALMOLOGICAL CONGRESSES.

E. Treacher Collins, F.R.C.S.,

LONDON, ENGLAND.

The following was the opening statement of the Chairman of the Anglo-American Convening Committee at Scheveningen on July 12, 1927.

*Friends and Colleagues:* Two years ago, at a general meeting of a convention of English-speaking Ophthalmological Societies held in London, there was a strongly-expressed desire for the re-establishment of the Periodic International Ophthalmological Congress. I, as President of that Convention, was asked to appoint an Anglo-American Committee of five to investigate and see what could be done in the matter.

I invited to act with me on this committee our veteran colleague, Dr. Edward Jackson of Denver, Colorado, who, I regret to say, has been prevented from being with us today; Dr. G. de Schweinitz of Philadelphia, who has had a wide experience of international ophthalmological affairs and who is willing to render still further assistance; Sir John Parsons, the President of the Ophthalmological Society of the United Kingdom, and Mr. Leslie Paton, to whose energy we are largely indebted for the arrangements of the present Conference.

After some consideration and correspondence this committee decided to invite each country, thru its National Ophthalmological Society or in some other way, to send two delegates to attend a Conference. These invitations have met with a cordial response from all quarters, and that is how we have come together in this hospitable country of Holland this afternoon.

It has been well said that the success of a society depends on the recollection of the great things its members have done together in the past, and on the will to accomplish new things in the future. I think it may be justly claimed that the International Ophthalmological Congresses have established great traditions. It is one of the oldest, if not the oldest, International Medical Association, having been first established in 1857 mainly by the energy and foresight of M. Warlomont, the editor of the *Annales d'Oculistique*.

The first meeting held in Brussels was attended by some 200 oculists from all parts of the world. It was in the golden days of ophthalmology, when the first fruits of Helmholtz's great invention of the ophthalmoscope were beginning to be gathered in. Von Graefe was there and delivered an impromptu and thrilling account of his investigations of glaucoma and of his newly-discovered treatment by iridectomy. Donders was also present, having recently formulated for all time the fundamental principles of sight-testing and of correction of errors of refraction.

It was originally arranged that the sessional meetings of the Congress should take place every fourth year at a different town, the place of the next meeting being determined before the close of each session. Wars, pestilence, and other unforeseen events have, however, from time to time prevented this orderly course of procedure.

The second meeting was held in Paris in 1862. It was then arranged that the third meeting should be held in Vienna in 1866, but owing to political complications and the outbreak of cholera it had to be postponed, and was ultimately held in Paris in 1867. Von Graefe, who presided over this meeting, invited the next Congress to assemble in Berlin in 1871, but before that time had arrived his too short and brilliant career had ended and war had broken out.

It was George Critchett who then took the initiative and invited the fourth Congress to meet in London, where a very successful session was held in 1872 with Donders in the chair. At its close Dr. Williams of

Cincinnati, U. S. A., presented an invitation for the Congress to meet in New York in 1876. There was at first some hesitation in accepting it on account of the distance from Europe. Dr. Williams, however, assured the Congress that under favorable conditions as regards wind and weather the voyage could be accomplished in ten days, and fifty European members ultimately journeyed to New York. If at some future date a fellow countryman of Dr. Williams presents us with a similar invitation he will probably be able to assure us that the journey to the United States by air, wind and weather permitting, will take only 48 hours.

In 1880, the sixth Congress was held in Milan and presided over by Dr. Quaglino. For some reason, I do not know what, a long interval then elapsed before the next meeting which was not until 1888, when, mainly thru the exertions of Dr. Otto Becker it assembled in Heidelberg. At that meeting a discussion took place as to whether the periodical International Ophthalmological Congresses should be continued or whether they should become merged in the General International Medical Congresses, which usually provides an Ophthalmological Section. The continuation of the Special Ophthalmological Congresses was strongly urged by Donders, who presided, and was ultimately agreed to.

Of the eighth Congress, held in Edinburgh, some of us here today were members. Dr. Argyll Robertson presided and in the course of his opening address sagely remarked:

"International distrust is most generally founded upon want of knowledge, and everything that tends to bring us into closer relationship with one another cannot but engender a spirit of mutual respect and esteem."

There are several of us who will recollect the ninth meeting of the Congress in this country at Utrecht in 1899, at which the personality of the revered Snellen pervaded over the whole of our proceedings.

From that time onwards, without any alteration in the written regulations, it seems to have been generally agreed that an interval of five years instead of four should be allowed to elapse between the successive meetings, so that the tenth meeting was held at Lucerne in 1904, and the eleventh at Naples in 1909.

The twelfth meeting was planned to take place at St. Petersburg in 1914, and, though not held, its *Comptes rendues,* with the opening papers of the discussions, and other communications, have been printed and circulated to the members.

Such then, gentlemen, is a very brief statement of what our forefathers accomplished in the way of International mutual aid for the promotion of ophthalmology in the past. It is now for this Conference to decide if we are willing to work together and accomplish new things in the future, in the interest of science and for the relief of suffering.

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Original papers, correspondence, and other scientific communications should be addressed to the Editor. Books for review may be sent to any member of the editorial staff. Reports of society proceedings should be sent to Dr. Lawrence T. Post, Metropolitan Bldg., St Louis, Mo.

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JEAN MATTESON, ROOM 1209, 7 West Madison Street, Chicago, Ill.

## GOING FORWARD.

With the completion of this volume of the Journal its editorial management passes from the writer to William H. Crisp. Dr. Crisp needs no introduction to those who read ophthalmic literature. After a dozen years work on it, as a collaborator, he has for five years edited the OPHTHALMIC YEAR BOOK. Only when it became clear that the bulk of those engaged in ophthalmic practice did not care enough for the Year Book to have it continued, was he free to come to this other field of service. His ability to rally support and to conscientiously carry on the work of editing such a publication, have been demonstrated. There can be no doubt that the change is a step forward.

Dr. Crisp will bring to the support of the Journal those who have been his active and efficient collaborators with the Year Book. The concentration on the Journal, of the work that has heretofore been done to keep up both publications, will ensure the development of a broader and more useful department of abstracts, translations and reviews. What the changes will be we need not forecast, but plans already considered will be developed in the next few issues. The policy of doing things, rather than promising to do them, will be continued. Already money that would have been required to continue the Year Book is showing better service, in the production of color plates for the Journal.

The changes made in the Journal will be well considered and will be developmental, not revolutionary. Practically all who have worked for it hitherto will go on working for it. It will still be the AMERICAN JOURNAL OF OPHTHALMOLOGY, but in the sense that America has important contributions to make to ophthalmic literature, and that this Journal offers a channel for reaching the minds and influencing the thought of workers in ophthalmology thruout the world. At the opening of a new year we face forward.

E. J.

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## RETINAL REFLECTIONS.

Light falling on any transparent substance is reflected from the surface. This is true of the retina, as it is of the cornea and crystalline lens, or of a plate of glass, or of a lake, or the layer of water on a wet pavement. The shape of the surface and the angle at which the light strikes it, determine from what position these reflexes will be visible. This is particularly important of the retina, for which the light to be reflected must enter thru the pupil; and the angle at which it strikes the retina depends on the re-

fraction of the eye and the divergence, or convergence of the rays as they fall upon it.

The reflections from the surface of a transparent medium interfere with seeing things thru it. This being true of the retina, the ophthalmoscope and the conditions for using it are generally so arranged as to avoid seeing the retinal reflections. If the reflection is uniform from all parts, and not too strong, it is not noticed, and does not interfere with seeing what lies back of the reflecting surface. The dilated pupil with a broad, diffuse source of light, gives uniform, unnoticed reflections. This is the kind of illumination in which changes in the retina, or behind the retina, in the choroid, are best seen: and these are the things most commonly studied with the ophthalmoscope.

It is when the reflected light from the retina is concentrated in some directions, and not visible in others, that it becomes most noticeable and interferes most with ophthalmoscopic inspection. The living retina has an undulating front surface. Hence, in some parts it acts as a convex, at others as a concave mirror. Before some parts of the retina the light is concentrated, before others it is dispersed. The eye placed in position to receive this reflected light sees points, lines, or a pattern of light on a dark background. Such appearances have been frequently mentioned under the names "shotted silk," or "watered silk" retina. The reflex from the fovea, the oval reflex enclosing the macula, of which usually only a part is visible at any one time, the reflexes that accompany the larger retinal vessels, shifting as the light or point of view is shifted, are retinal reflections, familiar to many who use the ophthalmoscope, but puzzling to any one who is not familiar with them. They are alluded to in some of the textbooks on diseases of the eye, but not mentioned in others. The absence of any description of them, in any of the works on physiologic optics, is a striking instance of the different point of view taken in the laboratory, from that of ophthalmic practice.

The clinical use of photography of the fundus, made practical by Nordenson's camera, demands some acquaintance with the reflections from the retina, to understand the significance of the pictures the camera gives us. This acquaintance is best obtained by using the "centric ophthalmoscopic illumination," suggested by Gullstrand. Such illumination is obtained by using a small, intense source of light, and a mirror that will focus the rays near the center of curvature of the cornea, removing the reflexes from the cornea and lens from the part of their surfaces thru which the retina and its reflexes are to be observed. The point at which the light is focussed being also near the center of curvature of the retinal surface, reflections from it can be obtained thru the pupil from all parts of the fundus, and their relations to the appearances caused by retinal exudates and scar tissue, or to opacities in the media, can be studied in any case. By such illumination these reflections are seen in the periphery of the fundus, as well as at the macula; and in old age they are present, altho not so bright as in children. They vary, of course, with the general pigmentation of the fundus.

"Five-sixths of the art of ophthalmoscopy is acquaintance with the normal fundus," said Loring; and the normal reflexes from the retina cannot be neglected by those who would become proficient in this art. Now that photographs of the fundus force these reflections upon our attention, as in plates 7, 8 and 9, it is to be hoped that many will become familiar with them, who have heretofore thought of them as of little practical importance.

E. J.

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## OCULISTS, OPTOMETRISTS AND OPTICIANS.

Confusion as to the qualifications and activities of these different classes of workers is profitable to somebody, and is being kept up in various ways. The Board of Education in an important city considered a proposition to finance a city wide survey of the eyes of school children. This was to in-

clude: "Examination of these children by certified optometrists and oculists"; and "The sending to the parent of a form of letter if, in the judgment of the optometrist or oculist, the children's eyes need attention."

Replying to the request for "expert opinion on such a survey," the following letter was sent:

"Replying to your letter and questionnaire: If a survey of the eyes of children in the schools of ....., is intended as a measure of public health, to make sure that the eyes of the children are healthy before they are subjected to the requirements of school work, it is a most worthy undertaking.

"But a pair of glasses is not all that is necessary to make eyes healthy or to keep them healthy. A person who has never studied anatomy or physiology, or the diseases of the eye or of the general body that affect the eye, even if he knows something about glasses, is not competent to make such a survey, or to prescribe what should be done by the parents of a child, to make its eyes healthy or keep them healthy.

"Your questionnaire seems to assume that an oculist who has studied medicine for five years and an optometrist, who has never studied medicine, are equally able to recognize disease in the eye and what may cause it, and thus equally competent to conduct a health survey. This is not true. Either may know something about glasses and may help to increase the sale of glasses and in doing so may help the health of some who need glasses. But a survey that spreads confusion about the health of the eyes and what that health depends on will not, on the whole, be helpful to the children in the schools of..... When it is decided what kind of a survey it is proposed to conduct, the questions can be answered intelligently."

Every new resource of therapeutics has been an opportunity for quackery. Chemistry, electricity, the X-ray, endocrines, vaccines and serums, have all opened new fields for the quack to take advantage of the ignorance or confusion of the popular mind. The medical and hygienic importance of glasses has served the same purpose; and it is natural that those who profit by confusion in the public mind should seek to extend and perpetuate the confusion.

E. J.

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## BOOK NOTICES.

**Ophthalmic Optics An Introductory Course.** Alfred Cowan, M.D., Assistant Professor of Ophthalmology, Graduate School of Medicine, University of Pennsylvania. Cloth, 8vo. 262 pages, 121 illustrations, 30 in colors. Philadelphia, F. A. Davis Co., 1927.

This book is based on notes from lectures and laboratory work, given to classes of graduates taking up the study of ophthalmology. The Graduate Course in Ophthalmology at Oxford, stimulated the production of Professor Thomson's Stereoscopic plates, showing the anatomy of the eye; the Physiologic Optics based on Experiments of Professor Burch; and the Anatomy of the Orbit by Professor Whitnall, later of Montreal, but then assistant to Professor Thomson, in the Department of Anatomy. It is interesting to know that the same stimulus is producing similar effects in the University of Pennsylvania. These books all met general needs of students of ophthalmology.

This book by Cowan fills a serious gap in the literature of optics in its ophthalmic relations. There are in English several excellent textbooks on optics; some of which are fairly complete as to the ophthalmic aspects of the science. But these are adapted to students well trained in and recently working with mathematics. Unfortunately most graduates in medicine have not had such training in mathematics; and even those who have had some of it are compelled to spend some time renewing their acquaintance with trigonometry and algebra before they can profit much by study of works on advanced optics.

This is truly an introductory course, making accessible, to those who have become interested in optics from its

clinical side, the complete and elaborate works, like those of Glazebrook, Gleichen, Southall, von Rohr, Helmholtz and Gullstrand. And to many, who will never undertake to read the larger works, this introduction will open a wider view of theoretic optics, and give a broader, surer grasp on ophthalmic optics than it is possible to attain by studying the subject only from the clinical side. The author has made use of many algebraic formulas and equations, that are not inviting to the average student of ophthalmology; but they are inevitable, if one wishes to be introduced to the work of the famous writers on physiologic optics, and no simpler, easier introduction to the subject has been offered. Whether you wish to enter upon a complete and laborious study of optics, or merely wish to go as far in this direction as you can, there is no book of the kind that can be more highly recommended.

The thirteen chapters, into which the book is divided, are headed: I. Introduction (elementary phenomena). II. Reflections at Plane Surfaces. III. Refraction at Plane Surfaces. IV. Reflections at Spherical Surfaces. V. Refraction at Spherical Surfaces. VI. Lenses. VII. Dioptric System of the Eye. VIII. Myopia. IX. Hyperopia. X. Astigmatism. XI. Accommodation. XII. Aperture of the System. Diffusion Images. XIII. Ophthalmoscopy, Retinoscopy. A full index, of 12 pages, completes the book, making it possible to refer directly to points that one especially desires to have cleared up. It is a text book for the student, and a reference book for future consultation.

The volume is mechanically excellent. The large type is clearly and uniformly printed, on opaque paper of high finish. The illustrations are carefully drawn to make clear the text, telling the story in diagrams that cannot be misunderstood. Those in colors use red to indicate one set of rays, while black lines are used to indicate another system, as black for incident and red for refracted rays. The scale and lettering of the diagrams are excellent. There are very few misprints or errors to correct in future editions.

Its educational effectiveness is increased by the large number of experiments described, to show the correctness of the formulas developed, and the examples given of their application. The author and his colleagues in ophthalmic practice are equally to be congratulated on the publication of this helpful book. The chapter on ophthalmoscopy will appeal to many readers as the most practical. It will be most serviceable to every one, who is shown by it how important an understanding of optics is, even for the most common examinations of the eye.

E. J.

**The Ophthalmic Year Book, Volume 23, edited by William H. Crisp, M.D., F.A.C.S., and 31 Collaborators. Cloth, 8vo, 338 pages.**

This volume, already in the hands of the readers of this JOURNAL, is in every way a worthy successor to the series that it completes. It has a dozen more pages than its immediate predecessor, but has the same arrangement and typography, with which its readers are familiar.

From year to year, the amount of literature related to particular topics varies. This year reference is made to 35 papers that give facts from biomicroscopy; last year but 25 were noted. But this is a growing subject, probably the increase of references to it in the literature is greater than this indicates. Mention of it is made in papers on a wider range of subjects.

The adherence to the form and arrangement previously adopted is a help to the reader, who has become familiar with the series, enabling him to find easily the important articles that have been added to the literature of any particular subject. This feature of the arrangement causes each added volume of the Year Book to contribute to the value of the series as a reference library. For the period it covers —an active period in the progress of ophthalmology—this series will have a permanent value. The personnel and number of the collaborators has varied

from year to year, but the system of arrangement showed only unimportant changes.

It is to be hoped that, from year to year, more have learned to use the Year Book, and get the service that it is able to afford. But apparently not enough appreciate it to assure its permanence.

Its suspension will be followed by changes in this JOURNAL, making it more useful to the mass of readers, and affording some compensation for the loss of the Year Book. The real student of ophthalmic literature will still go ahead, with the best helps he can find, until even better means may be proposed and carried into effect.

E. J.

**Reports of Eye Clinics, Sessions 1926-1927. L. Webster Fox,** Professor of Ophthalmology, Graduate School of of Medicine, University of Pennsylvania. Paper, 8 vo., 118 pages. Philadelphia, July, 1927.

This volume contains the condensed reports of 486 cases treated at the Medico-Chirurgical Hospital. They include a wide range of ophthalmic conditions, a large part of them requiring operative treatment. The operations and the exact conditions for which they were done, are described with sufficient detail to make the reports valuable for reference to any one engaged in ophthalmic practice.

The reports of cases seen on a certain day are grouped together, without any attempt to group similar disease together, except the 31 cases grouped under "slit-lamp clinics." To use this as a book of reference for the study of any particular topic, the index is necessary; and a 9-column index, containing over 1,200 references, is supplied. There is much valuable experience recorded in these reports, and the index makes it available.

E. J.

**Trachoma Tesis. Dr. Marcelo Dusseldorp,** Oculist to the Alvear and Tornu Hospitals, and the Institute of Medical Research, Buenos Aires. Paper, large 8 vo., 205 pages, 83 illustrations. Buenos Aires, Talleres Grafico Argentinos, 1927.

This monograph is divided into six chapters, which deal with the following aspects of the disease: I The Symptomatology of Trachoma and Its Complications in the Conjunctiva, Cornea, Sclera, Lids and Lacrimal Passages. II Its Differential Diagnosis from other forms of conjunctivitis, and other forms of conjunctival disease. III Biomicroscopy of the Palpebral Conjunctiva. IV Pathologic Anatomy, both of trachoma and of other forms of conjunctivitis, likely to be mistaken for trachoma. V Experiments with some forms of treatment, including the heat cautery of Abadie and intravenous and subconjunctival injections. VI Trachoma in the Northern Provinces of Argentina.

The chapter on biomicroscopy of the palpebral conjunctiva, 28 pages, gives much more than the conditions thus observed in trachoma. It starts with the technic of such examinations, takes up the appearances of the normal conjunctiva, vital staining, and conditions seen in vernal conjunctivitis and nine other forms of conjunctival disease, beside trachoma. These conditions are defined by brief reports of illustrative cases, to the number of 53 and there are 47 illustrations in this chapter, making it a monograph and atlas on its subject.

Chapter VI, 48 pages, is also a monograph, recording trachoma in a region where the proportion of children infected in the schools has run from 9 to 20 per cent; and where, in eye clinics, as high as 50 per cent have had trachoma. This is an inland region from 1,000 to 1,500 feet above sea level, without large cities and with a subtropical climate.

This is, on the whole, the best work upon trachoma that has been published in America, North or South; and it is as scientific and, for American ophthalmologists, as practical a treatise as there is in the literature in any language. It is worthy of study by any one who wishes to write of trachoma.

E. J.

**Public Health Service of the United States.** Annual Report of Surg. General, H. S. Cumming. Cloth, 8 vo., 330 pages. Washington, Government Printing Office.

This is the Report for the fiscal year ending June 30, 1926, and is designated as Treasury Department Document No. 2967. It is to be regretted that absence of distinctive page headings, and systematic division of subjects treated, compels the student to tedious research for what may be of especial interest, and diminishes the value of this volume, as a book of reference.

It is of ophthalmic interest, that almost one-twelfth of the expenditure was incurred for trachoma prevention. Of the four trachoma hospitals, operating at the beginning of the year, one in Minnesota was closed because the State Legislature had not appropriated necessary funds. But one was opened in Richmond, Kentucky, in the McDowell Memorial Building belonging to the State Medical Society. At the close of the year each hospital was full, and had a waiting list of patients, many of whom were in urgent need of treatment. It is recommended that "In locating new hospitals the aim should be to secure buildings capable of accommodating at least 40 patients."

Studies in the natural illumination of class rooms, and of the vision of school children, made at Hagerstown, Md., and in the District of Columbia, are reported. The latter included the use of a cycloplegic, and the statistics of errors of refraction found under cycloplegia in 1,149 children. The bulletin on illumination of class rooms "was written from the standpoint of the average school commissioner or county official." There seems to be need of expert assistance in this direction, such as is utilized in other parts of the Scientific Research Division.

E. J.

**Diet and Disease. William E. Deeks,** M.D., New York City. Paper, 8 vo., 49 pages. Reprinted from American Journal of Tropical Medicine.

As head of the Medical Department of the United Fruit Company, with its many hospitals and medical centers in tropical countries, this author has a medical and administrative interest in the recent advances in dietetics. His survey of the subject is practical, accurate, and sufficiently complete to make this monograph valuable reading for any physician. Vitamins, endocrines and calories give the latest aspect of this oldest subject of human interest.

Vitamin A is called the "antiophthalmic vitamin." Its recognition has thrown a flood of light on cases of keratomalacia, xerophthalmia, and epidemic night blindness. Its recognized abundance in butter, cod liver oil and egg yolk, supplies a new armamentarium for therapeutics.

E. J.

## CORRESPONDENCE.

### Be Yourself.

*To the Editor*:

When the prevailing quiet is disturbed by the sharply ejaculated "Be yourself," it is generally understood that the would-be funny person, or the socially (perhaps financially) presumptuous, is beginning to go to extremes; and I have sometimes wondered if this protestation might, properly, be given wider usage. I am led to this conjecture by the observation of a, seemingly, growing tendency among medical men to take themselves too seriously. It may have been abundantly proven that they are the "guardians of the public health," but there is still a difference between the assumption of that title, and having it thrust upon them—at least in this United States, where paternalism is still on trial.

Nor is the situation clarified by the proposal to "cap the climax" in preventive medicine by the periodic health examination,—*for a consideration.* Nor, still further, has medical legislation for the elimination of unqualified, (which satisfies nobody) furnished a background on which to predicate altruism; possibly the very opposite. Everywhere the shadow of the "consideration" is discernible and that particular shadow is worse than the sub-

stance, because there are few to deny that the workman is worthy of his hire.

Speaking now specifically, rather than generically, it is to be noted, regretfully this time, that, again, ophthalmology plays, herein, a prominent part. Its office windows emblazoned with "Eye, Ear, Nose, and Throat;" a certificate of proficiency by the "American Board" (without legal status); and a new title, "Eye Physician," certainly bespeak a campaign for business which, in the main, suggests negatively the time honored maxim: "Doctors should (do) not advertise." Add, then, to these things the declaration of the Ophthalmic Section of the A. M. A. that it is "bad form" for a doctor to dispense his own prescription for glasses, plus the appointing a Committee on Optometry by the Academy, and the deduction is logical that the competition of the irregulars has been recognized.

After more than 50 years on the firing line I may have reached my dotage. But as the years have rolled on I have been more and more thankful that I heeded the fatherly advice I got in my youth. The advice ran this way: "Waste no thought on your reputation, or how many patients your neighbor gets. If you make it your business to be better qualified every tomorrow than the day before, your reputation will come as fast as you can take care of it." In other words: Be yourself. "Guard your liberties" was the recent injunction of England's Lord Chief Justice. This plainly shows that he has not forgotten, as we are forgetting, what happened to the paternalistic Kaiser. Few altruisms, without taint of personal gain, are less than colossal undertakings; with that taint they confound themselves.

My opposition to paternalism (outside of the family) is perhaps the reason why I, as just plain "Doctor," live (reasonably well too) in peace with all my neighbors—irregulars as well as regulars.

H. B. Young.

# NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. H. Alexander Brown, San Francisco; Dr. Wm. Thornwall Davis, Washington; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. George H. Kress, Los Angeles; Dr. Edward D. LeCompte, Salt Lake City; Dr. W. H. Lowell, Boston; Dr. G. Oram Ring, Philadelphia; Dr. Charles P. Small, Chicago; Dr. G. McD. VanPoole, Honolulu.

DEATHS.

Dr. Edward H. Higbee, Jr., St. Louis, aged fifty-three, died September twentieth of pneumonia. He was Assistant Professor of Ophthalmology, St. Louis University School of Medicine.

Dr. Eugene Smith, Detroit, aged eighty-two, died September twelfth, of acute bronchitis. He was Emeritus Professor of Ophthalmology and Otology, Detroit College of Medicine. He was Secretary of the Section of Ophthalmology of the American Medical Association in 1880 and Chairman in 1885.

SOCIETIES.

The Section on Ophthalmology of the College of Physicians of Philadelphia met Thursday evening, November seventeenth, when the following program was given: Dr. W. F. Mengel, by invitation, "Massive Exudate of the Retina"; Exhibition of Case; Dr. T. B. Holloway, Exhibition of an Instrument for Removal of Intraocular Non-Magnetic Foreign Bodies; Dr. Francis Heed Adler, "A Comparative Study of the Role of Pigment in the Physiology of Vision"; Dr. E. A. Shumway and Dr. Perce DeLong, "A Lantern Demonstration of Tumors of the Conjunctiva"; Dr. Luther C. Peter, "An Unusual Form of Symmetric Lenticular Opacities in the Adult Nuclear Zones"; Dr. T. B. Holloway, Motion Pictures Pertaining to Certain Orbital Conditions.

The 21st South African Medical Congress was held in Pretoria from 4 to 9, October 26, 1926. Dr. A. W. Saunders presiding. The section for special subjects was presided over by Dr. R. M. Leith. The subject, "Teamwork in the Diagnosis of Cerebral Tumor," was introduced by Dr. F. H. Kooy. The following papers were read: "Some Results of Trephining Operation for Glaucoma," Dr. A. G. Brinton; "Influence of Calcium on the Eye," Dr. John S. Steyn; "Treatment of Conical Cornea with Contact Glasses," Dr. Th. Wassenaar; "Eye Surgery and Therapeutics," Dr. S. De Moor.

The Southern Medical Association held its 21st annual meeting at Memphis, Tenn., Nov. fourteenth to seventeenth, inclusive. The Section on Ophthalmology, Rhinology and Laryngology had almost 200 members registered in attendance, and its program included twenty papers which were read and discussed. The chairman was Dr. Clifton M. Miller of Richmond, Va. His successor is Dr. Edward A. Looper of Baltimore. The success of the meeting was largely due to the work of the secretary, Dr. Fred E. Hasty of Nashville, Tenn. Examinations of the American Board of Ophthalmic Examinations and those of the American Board of Oto-Laryngology were held in connection with the meeting, on Monday. These examinations brought the attendance of prominent members of these Boards from other sections of the country. The Ophthalmic Board had 13 applicants before it, and the Oto-Laryngologic Board more than 50. The next meeting of the Association will be held at Asheville, North Carolina.

Of the papers read before the Section, the following dealt with ophthalmology: Chairman's address, "The Relation of the Ophthalmologist to the General Medical Profession," Clifton M. Miller, Richmond, Va.; "Health Examinations of the Eye," Edward Jackson, Denver, Colo.; "Tuberculosis in Relation to the Eye," Emory Hill, Richmond, Va.; "The Therapeutic Use of Tuberculin in Ocular Tuberculosis," Alan C. Woods and Benjamin Rones, Baltimore, Md.; "Clinical Significance of Optic Neuritis and Papilledema," Adolph O. Pfingst, Louisville, Ky.; "The Cure of Strabismus," Oscar Wilkinson, Washington, D. C.; "Iridotasis for Glaucoma," J. E. Dupuy, New Orleans, La.; "Fractures About the Orbit," W. D. Gill, San Antonio, Texas; "Retinal Behavior as Influenced by the Sphenoid Sinus," M. Earle Brown, New Orleans; "Vertigo Characteristics," M. A. Lischkoff, Pensacola, Fla.

PERSONALS.

Dr. Albert Lemoine of Kansas City is now in Vienna doing special work.

Dr. Joseph W. McKee of Kansas City was married to Miss Esther Paxon on November twelfth.

Dr. Casey A. Wood, Chicago, has been made a life member of the Academy of Ophthalmology and Oto-Laryngology.

Dr. William T. Shoemaker has removed his office and residence to 2017 Locust street, Philadelphia, Pa.

Dozent Adalbert Fuchs has been appointed to succeed Prof. Lindner at the Poliklinik in Vienna.

Dr. J. W. Kimberlin of Kansas City has removed his offices to the Lathrop building, where he is associated with Dr. Morris Clark.

Dr. George M. Constans, formerly with the Mayo Clinic, Rochester, Minn., has removed to Bismarck, N. D., and is associated with the Quain and Ramstad Clinic.

The University of Colorado, on the occasion of its semicentennial celebration recently, conferred the honorary degree of Doctor of Science upon Dr. Edward Jackson.

Dr. George F. Suker of Chicago was the only ophthalmologist on the program of the recent Interstate Clinical meeting at Kansas City. He delivered the Snyder Foundation ad-

dress, his subject being "Optic Atrophy of Tabes."

Owing to misinformation furnished us an October news item stated that Dr. William G. Reeder had been appointed to the chair of Ophthalmology at Rush Medical College. The Dean of the School states that as yet no one has been appointed to succeed the late Francis Lane.

MISCELLANEOUS.

The New York Post Graduate School was left $10,000 by the late Mrs. Joseph Pulitzer.

On October seventeenth, the anniversary of Ether Day, the Massachusetts Eye and Ear Infirmary invited friends to attend the opening of the new building connecting the two outpatient departments.

Dr. Charles W. Richardson, of Washington, D. C., was recently elected President of "The Fossils," an organization formed more than fifty years ago by sixty-two boys in Philadelphia. It was then called the National Amateur Press Association. Thomas A. Edison, Col. George Harvey, Frank B. Noyes, C. C. Curtis, and Charles Scribner are members of this unique organization.

A gift of $250,000.00 has been made to the University of Chicago Medical School, to be known as the Louis B. and Emma M. Kuppenheimer Foundation. The income is to be used for a study of the structure, functions and diseases of the eye, and for the support of teaching and research in the department of ophthalmology. This department has been organized under the leadership of Dr. E. V. L. Brown.

A letter dated October 18th, to Dr. Clarence Loeb from Dr. W. F. Moncreiff of Chicago, contains the following: "It occurred to me that you might be interested to have news of the Fourth International Congress of Ophthalmology in Vienna, for the American Journal of Ophthalmology. There are four men from Chicago in the class of sixteen men, Drs. Soper, Rainey, Kulvin and myself, all graduates of Rush, and three of us are ex-interns in Cook County Hospital. There are two members from China, two from Egypt, one from Manila, and Dr. Pinkerton, an American from Honolulu. The other six are men from the United States, four from the middle west and two from Pennsylvania.

On Saturday evening, October 15th, the class was entertained at a banquet given by the instructors to the class at the Hotel Meisel and Schalen. Dozent Dr. Adalbert Fuchs was Master of Ceremonies, and we also were honored by some remarks from Hofrat Prof. Ernst Fuchs and also Prof. J. Meller. It was a memorable occasion for all of us. Dr. Finnoff of Denver and his wife are making a tour of Europe, and are here in Vienna for a few days. Last evening we attended a meeting of the Vienna Ophthalmological Society, and afterwards were entertained at dinner by Prof. J. Meller with very generous hospitality. Today we had lunch with Dr. Adalbert Fuchs and his father at their home."

# Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in *heavy-faced type*. The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper.

## BOOKS

**Falchi, F.** Cistotomia Peripupillare perla cura delle Cataratta Secondaria. Paper, 8 vo, 87 pages, 19 ill. Pavia, 1926. A. J. O., 1927, v. 10, p. 864.

**Fuchs, A.** Atlas of Histology of Eye. Pt. 2, Cloth, 32 col. ill., 108 ill. F. Deuticke, Leipsig and Vienna. A. J. O., 1927, v. 10, p. 865.

**Greene, J. S., and Wells, E. J.** Cause and Cure of Speech Disorders. Macmillan Co. 1927. A. J. O., 1927, v. 10, p. 866.

**Hadley, H. C.** Sight Saving Classes in Public Schools. Paper, 12 mo., 90 pages, 5 ill. F. J. Heer Printing Co., Columbus, Ohio. A. J. O., 1927, v. 10, p. 866.

**Kofler, K., and Urbanek, J.** West-Polyak Endonasal Tränensackoperationen. Paper 8 vo, 65 pages, 18 ill. S. Karger, Berlin, 1927. A. J. O., 1927, v. 10, p. 866.

**Meriel, P.** Etude therapeutique des tumeurs de l'Hypophysis. 120 pages, 8 plates. Masson et Cie, Paris, 1927. Arch. d'Opht., 1927, v. 44, p. 653.

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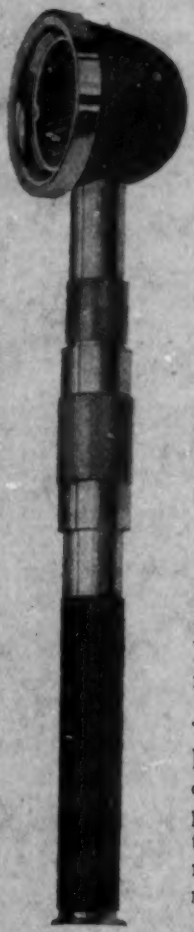

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